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(54) Title: CLONING OF CYTOCHROME P450 GENES FROM NICOTIANA

(57) Abstract: The present invention relates to p450 enzymes and nucleic acid sequences encoding p450 enzymes in Nicotiana, and methods of using those enzymes and nucleic acid sequences to alter plant phenotypes.



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## CLONING OF CYTOCHROME P450 GENES FROM NICOTIANA

The present invention relates to nucleic acid sequences encoding cytochrome p450 enzymes (hereinafter referred to as p450 and p450 enzymes) in *Nicotiana* plants and methods for using those nucleic acid sequences to alter plant phenotypes.

### BACKGROUND

Cytochrome p450s catalyze enzymatic reactions for a diverse range of chemically dissimilar substrates that include the oxidative, peroxidative and reductive metabolism of endogenous and xenobiotic substrates. In plants, p450s participate in biochemical pathways that include the synthesis of plant products such as phenylpropanoids, alkaloids, terpenoids, lipids, cyanogenic glycosides, and glucosinolates (Chappel, Annu. Rev. Plant Physiol. Plant Mol. Biol. 198, 49:311-343). Cytochrome p450s, also known as p450 heme-thiolate proteins, usually act as terminal oxidases in multi-component electron transfer chains, called p450-containing monooxygenase systems. Specific reactions catalyzed include demethylation, hydroxylation, epoxidation, N-oxidation, sulfoxidation, N-, S-, and O-dealkylations, desulfation, deamination, and reduction of azo, nitro, and N-oxide groups.

The diverse role of *Nicotiana* plant p450 enzymes has been implicated in effecting a variety of plant

metabolites such as phenylpropanoids, alkaloids, terpenoids, lipids, cyanogenic glycosides, glucosinolates and a host of other chemical entities. During recent years, it is becoming apparent that some p450 enzymes can impact the composition of plant metabolites in plants. For example, it has been long desired to improve the flavor and aroma of certain plants by altering its profile of selected fatty acids through breeding; however very little is known about mechanisms involved in controlling the levels of these leaf constituents. The down regulation of p450 enzymes associated with the modification of fatty acids may facilitate accumulation of desired fatty acids that provide more preferred leaf phenotypic qualities. The function of p450 enzymes and their broadening roles in plant constituents is still being discovered. For instance, a special class of p450 enzymes was found to catalyze the breakdown of fatty acid into volatile C6- and C9-aldehydes and -alcohols that are major contributors of "fresh green" odor of fruits and vegetables. The level of other novel targeted p450s may be altered to enhance the qualities of leaf constituents by modifying lipid composition and related break down metabolites in *Nicotiana* leaf. Several of these constituents in leaf are affected by senescence that stimulates the maturation of leaf quality properties. Still other reports have shown that p450s enzymes are play a functional role in altering fatty acids that are involved in plant-pathogen interactions and disease resistance.

In other instances, p450 enzymes have been suggested to be involved in alkaloid biosynthesis. Nornicotine is a minor alkaloid found in *Nicotiana tabaceum*. It has been postulated that it is produced by the p450 mediated demethylation of nicotine followed by acylation and nitrosation at the N position thereby producing a series of N-acylnonicotines and N-nitrosonornicotines. N-demethylation, catalyzed by a putative p450 demethylase, is thought to be a primary source of nornicotine biosyntheses in *Nicotiana*. While the enzyme is believed to be microsomal, thus far a nicotine demethylase enzyme has not been successfully purified, nor have the genes involved been isolated.

Furthermore, it is hypothesized but not proven that the activity of p450 enzymes is genetically controlled and also strongly influenced by environment factors. For example, the demethylation of nicotine in *Nicotiana* is thought to increase substantially when the plants reach a mature stage. Furthermore, it is hypothesized yet not proven that the demethylase gene contains a transposable element that can inhibit translation of RNA when present.

The large multiplicity of p450 enzyme forms, their differing structure and function have made their research on *Nicotiana* p450 enzymes very difficult before the enclosed invention. In addition, cloning of p450 enzymes has been hampered at least in part because these

membrane-localized proteins are typically present in low abundance and often unstable to purification. Hence, a need exists for the identification of p450 enzymes in plants and the nucleic acid sequences associated with those p450 enzymes. In particular, only a few cytochrome p450 proteins have been reported in *Nicotiana*. The inventions described herein entail the discovery of a substantial number of cytochrome p450 fragments that correspond to several groups of p450 species based on their sequence identity.

#### SUMMARY

The present invention is directed to plant p450 enzymes. The present invention is further directed to plant p450 enzymes from *Nicotiana*. The present invention is also directed to p450 enzymes in plants whose expression is induced by ethylene and/or plant senescence. The present invention is yet further directed to nucleic acid sequences in plants having enzymatic activities, for example, being categorized as oxygenase, demethylase and the like, or other and the use of those sequences to reduce or silence the expression or over-expression of these enzymes. The invention also relates to p450 enzymes found in plants containing higher nornicotine levels than plants exhibiting lower nornicotine levels.

In one aspect, the invention is directed to nucleic acid sequences as set forth in SEQ. ID. Nos. 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35,

37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295 and 297.

In a second related aspect, those fragments containing greater than 75% identity in nucleic acid sequence were placed into groups dependent upon their identity in a region corresponding to the first nucleic acid following the cytochrome p450 motif GXRXCX(G/A) to the stop codon. The representative nucleic acid groups and respective species are shown in Table I.

In a third aspect, the invention is directed to amino acid sequences as set forth in SEQ. ID. Nos. 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184,

186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296 and 298.

In a fourth related aspect, those fragments containing greater than 71% identity in amino acid sequence were placed into groups dependent upon their identity to each other in a region corresponding to the first amino acid following the cytochrome p450 motif GXRXCX(G/A) to the stop codon. The representative amino acid groups and respective species are shown in Table II.

In a fifth aspect, the invention is directed to amino acid sequences of full length genes as set forth in SEQ. ID. Nos. 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296 and 298.

In a sixth related aspect, those full length genes containing 85% or greater identity in amino acid sequence were placed into groups dependent upon the identity to

each other. The representative amino acid groups and respective species are shown in Table III.

In a seventh aspect, the invention is directed to amino acid sequences of the fragments set forth in SEQ. ID. Nos. 299-357.

In the eighth related aspect, those fragments containing 90% or greater identity in amino acid sequence were placed into groups dependent upon their identity to each other in a region corresponding to the first cytochrome p450 domain, UXXRXXZ, to the third cytochrome domain, GXR XO, where U is E or K, X is any amino acid and Z is R, T, S or M. The representative amino acid groups respective species shown in Table IV.

In a ninth related aspect, the reduction or elimination or over-expression of p450 enzymes in Nicotiana plants may be accomplished transiently using RNA viral systems.

Resulting transformed or infected plants are assessed for phenotypic changes including, but not limited to, analysis of endogenous p450 RNA transcripts, p450 expressed peptides, and concentrations of plant metabolites using techniques commonly available to one having ordinary skill in the art.

In a tenth important aspect, the present invention is also directed to generation of transgenic Nicotiana

lines that have altered p450 enzyme activity levels. In accordance with the invention, these transgenic lines include nucleic acid sequences that are effective for reducing or silencing or increasing the expression of certain enzyme thus resulting in phenotypic effects within *Nicotiana*. Such nucleic acid sequences include SEQ. ID. Nos. 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295 and 297.

In a very important eleventh aspect of the invention, plant cultivars including nucleic acids of the present invention in a down regulation capacity using either full length genes or fragments thereof or in an over-expression capacity using full length genes will have altered metabolite profiles relative to control plants.

In a twelfth aspect of the invention, plant cultivars including nucleic acid of the present invention

using either full length genes or fragments thereof in modifying the biosynthesis or breakdown of metabolites derived from the plant or external to the plants, will have use in tolerating certain exogenous chemicals or plant pests. Such nucleic acid sequences include SEQ ID. Nos. 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295 and 297.

In a thirteenth aspect, the present invention is directed to the screening of plants, more preferably Nicotiana, that contain genes that have substantial nucleic acid identity to the taught nucleic acid sequence. The use of the invention would be advantageous to identify and select plants that contain a nucleic acid sequence with exact or substantial identity where such plants are part of a breeding program for traditional or transgenic varieties, a mutagenesis program, or naturally occurring diverse plant populations. The screening of plants for substantial nucleic acid identity may be

accomplished by evaluating plant nucleic acid materials using a nucleic acid probe in conjunction with nucleic acid detection protocols including, but not limited to, nucleic acid hybridization and PCR analysis. The nucleic acid probe may consist of the taught nucleic acid sequence or fragment thereof corresponding to SEQ ID 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295 and 297.

In a fourteenth aspect, the present invention is directed to the identification of plant genes, more preferably *Nicotiana*, that share substantial amino acid identity corresponding to the taught nucleic acid sequence. The identification of plant genes including both cDNA and genomic clones, those cDNAs and genomic clones, more preferably from *Nicotiana* may be accomplished by screening plant cDNA libraries using a nucleic acid probe in conjunction with nucleic acid detection protocols including, but not limited to,

nucleic acid hybridization and PCR analysis. The nucleic acid probe may be comprised of nucleic acid sequence or fragment thereof corresponding to SEQ ID 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 143, 145 and 147.

In an alternative fifteenth aspect, cDNA expression libraries that express peptides may be screened using antibodies directed to part or all of the taught amino acid sequence. Such amino acid sequences include SEQ ID 2, 4, 8, 9, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 144, 146, 148.

In a sixteenth important aspect, the present invention is also directed to generation of transgenic *Nicotiana* lines that have over-expression of p450 enzyme activity levels. In accordance with the invention, these transgenic lines include all nucleic acid sequences encoding the amino acid sequences of full length genes that are effective for increasing the expression of certain enzyme thus resulting in phenotypic effects within *Nicotiana*. Such amino acid sequences include SEQ.

ID. 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296 and 298.

#### BRIEF DESCRIPTION OF DRAWINGS

Figure 1 shows nucleic acid SEQ. ID. No.:1 and amino acid SEQ. ID. No.:2.

Figure 2 shows nucleic acid SEQ. ID. No.:3 and amino acid SEQ. ID. No.:4.

Figure 3 shows nucleic acid SEQ. ID. No.:5 and amino acid SEQ. ID. No.:6.

Figure 4 shows nucleic acid SEQ. ID. No.:7 and amino acid SEQ. ID. No.:8.

Figure 5 shows nucleic acid SEQ. ID. No.:9 and amino acid SEQ. ID. No.:10.

Figure 6 shows nucleic acid SEQ. ID. No.:11 and amino acid SEQ. ID. No.:12.

Figure 7 shows nucleic acid SEQ. ID. No.:13 and amino acid SEQ. ID. No.:14.

Figure 8 shows nucleic acid SEQ. ID. No.:15 and amino acid SEQ. ID. No.:16.

Figure 9 shows nucleic acid SEQ. ID. No.:17 and amino acid SEQ. ID. No.:18.

Figure 10 shows nucleic acid SEQ. ID. No.:19 and amino acid SEQ. ID. No.:20.

Figure 11 shows nucleic acid SEQ. ID. No.:21 and

amino acid SEQ. ID. No.:22.

Figure 12 shows nucleic acid SEQ. ID. No.:23 and amino acid SEQ. ID. No.:24.

Figure 13 shows nucleic acid SEQ. ID. No.:25 and amino acid SEQ. ID. No.:26.

Figure 14 shows nucleic acid SEQ. ID. No.:27 and amino acid SEQ. ID. No.:28.

Figure 15 shows nucleic acid SEQ. ID. No.:29 and amino acid SEQ. ID. No.:30.

Figure 16 shows nucleic acid SEQ. ID. No.:31 and amino acid SEQ. ID. No.:32.

Figure 17 shows nucleic acid SEQ. ID. No.:33 and amino acid SEQ. ID. No.:34.

Figure 18 shows nucleic acid SEQ. ID. No.:35 and amino acid SEQ. ID. No.:36.

Figure 19 shows nucleic acid SEQ. ID. No.:37 and amino acid SEQ. ID. No.:38.

Figure 20 shows nucleic acid SEQ. ID. No.:39 and amino acid SEQ. ID. No.:40.

Figure 21 shows nucleic acid SEQ. ID. No.:41 and amino acid SEQ. ID. No.:42.

Figure 22 shows nucleic acid SEQ. ID. No.:43 and amino acid SEQ. ID. No.:44.

Figure 23 shows nucleic acid SEQ. ID. No.:45 and amino acid SEQ. ID. No.:46.

Figure 24 shows nucleic acid SEQ. ID. No.:47 and amino acid SEQ. ID. No.:48.

Figure 25 shows nucleic acid SEQ. ID. No.:49 and amino acid SEQ. ID. No.:50.

Figure 26 shows nucleic acid SEQ. ID. No.:51 and

amino acid SEQ. ID. No.:52.

Figure 27 shows nucleic acid SEQ. ID. No.:53 and amino acid SEQ. ID. No.:54.

Figure 28 shows nucleic acid SEQ. ID. No.:55 and amino acid SEQ. ID. No.:56.

Figure 29 shows nucleic acid SEQ. ID. No.:57 and amino acid SEQ. ID. No.:58.

Figure 30 shows nucleic acid SEQ. ID. No.:59 and amino acid SEQ. ID. No.:60.

Figure 31 shows nucleic acid SEQ. ID. No.:61 and amino acid SEQ. ID. No.:62.

Figure 32 shows nucleic acid SEQ. ID. No.:63 and amino acid SEQ. ID. No.:64.

Figure 33 shows nucleic acid SEQ. ID. No.:65 and amino acid SEQ. ID. No.:66.

Figure 34 shows nucleic acid SEQ. ID. No.:67 and amino acid SEQ. ID. No.:68.

Figure 35 shows nucleic acid SEQ. ID. No.:69 and amino acid SEQ. ID. No.:70.

Figure 36 shows nucleic acid SEQ. ID. No.:71 and amino acid SEQ. ID. No.:72.

Figure 37 shows nucleic acid SEQ. ID. No.:73 and amino acid SEQ. ID. No.:74.

Figure 38 shows nucleic acid SEQ. ID. No.:75 and amino acid SEQ. ID. No.:76.

Figure 39 shows nucleic acid SEQ. ID. No.:77 and amino acid SEQ. ID. No.:78.

Figure 40 shows nucleic acid SEQ. ID. No.:79 and amino acid SEQ. ID. No.:80.

Figure 41 shows nucleic acid SEQ. ID. No.:81 and

amino acid SEQ. ID. No.:82.

Figure 42 shows nucleic acid SEQ. ID. No.:83 and amino acid SEQ. ID. No.:84.

Figure 43 shows nucleic acid SEQ. ID. No.:85 and amino acid SEQ. ID. No.:86.

Figure 44 shows nucleic acid SEQ. ID. No.:87 and amino acid SEQ. ID. No.:88.

Figure 45 shows nucleic acid SEQ. ID. No.:89 and amino acid SEQ. ID. No.:90.

Figure 46 shows nucleic acid SEQ. ID. No.:91 and amino acid SEQ. ID. No.:92.

Figure 48 shows nucleic acid SEQ. ID. No.:95 and amino acid SEQ. ID. No.:96.

Figure 49 shows nucleic acid SEQ. ID. No.:97 and amino acid SEQ. ID. No.:98.

Figure 50 shows nucleic acid SEQ. ID. No.:99 and amino acid SEQ. ID. No.:100.

Figure 51 shows nucleic acid SEQ. ID. No.:101 and amino acid SEQ. ID. No.:102.

Figure 52 shows nucleic acid SEQ. ID. No.:103 and amino acid SEQ. ID. No.:104.

Figure 53 shows nucleic acid SEQ. ID. No.:105 and amino acid SEQ. ID. No.:106.

Figure 54 shows nucleic acid SEQ. ID. No.:107 and amino acid SEQ. ID. No.:108.

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Figure 63 shows nucleic acid SEQ. ID. No.:125 and amino acid SEQ. ID. No.:126.

Figure 64 shows nucleic acid SEQ. ID. No.:127 and amino acid SEQ. ID. No.:128.

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Figure 66 shows nucleic acid SEQ. ID. No.:131 and amino acid SEQ. ID. No.:132.

Figure 67 shows nucleic acid SEQ. ID. No.:133 and amino acid SEQ. ID. No.:134.

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Figure 69 shows nucleic acid SEQ. ID. No.:137 and amino acid SEQ. ID. No.:138.

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Figure 73 shows nucleic acid SEQ. ID. No.:145 and

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Figure 74 shows nucleic acid SEQ. ID. No.:147 and amino acid SEQ. ID. No.:148.

Figure 75 shows nucleic acid SEQ. ID No.: 149 and amino acid SEQ. ID. No.: 150.

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Figure 83 shows nucleic acid SEQ. ID No.: 165 and amino acid SEQ. ID. No.: 166.

Figure 84 shows nucleic acid SEQ. ID No.: 167 and amino acid SEQ. ID. No.: 168.

Figure 85 shows nucleic acid SEQ. ID No.: 169 and amino acid SEQ. ID. No.: 170.

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Figure 99 shows nucleic acid SEQ. ID No.: 197 and amino acid SEQ. ID. No.: 198.

Figure 100 shows nucleic acid SEQ. ID No.: 199 and amino acid SEQ. ID. No.: 200.

Figure 101 shows nucleic acid SEQ. ID No.: 201 and amino acid SEQ. ID. No.: 202.

Figure 102 shows nucleic acid SEQ. ID No.: 203 and amino acid SEQ. ID. No.: 204.

Figure 103 shows nucleic acid SEQ. ID No.: 205 and amino acid SEQ. ID. No.: 206.

Figure 104 shows nucleic acid SEQ. ID No.: 207 and amino acid SEQ. ID. No.: 208.

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Figure 109 shows nucleic acid SEQ. ID No.: 217 and amino acid SEQ. ID. No.: 218.

Figure 110 shows nucleic acid SEQ. ID No.: 219 and amino acid SEQ. ID. No.: 220.

Figure 111 shows nucleic acid SEQ. ID No.: 221 and amino acid SEQ. ID. No.: 222.

Figure 112 shows nucleic acid SEQ. ID No.: 223 and amino acid SEQ. ID. No.: 224.

Figure 113 shows nucleic acid SEQ. ID No.: 225 and amino acid SEQ. ID. No.: 226.

Figure 114 shows nucleic acid SEQ. ID No.: 227 and amino acid SEQ. ID. No.: 228.

Figure 115 shows nucleic acid SEQ. ID No.: 229 and amino acid SEQ. ID. No.: 230.

Figure 116 shows nucleic acid SEQ. ID No.: 231 and amino acid SEQ. ID. No.: 232.

Figure 117 shows nucleic acid SEQ. ID No.: 233 and amino acid SEQ. ID. No.: 234.

Figure 118 shows nucleic acid SEQ. ID No.: 235 and amino acid SEQ. ID. No.: 236.

Figure 119 shows nucleic acid SEQ. ID No.: 237 and amino acid SEQ. ID. No.: 238.

Figure 120 shows nucleic acid SEQ. ID No.: 239 and amino acid SEQ. ID. No.: 240.

Figure 121 shows nucleic acid SEQ. ID No.: 241 and amino acid SEQ. ID. No.: 242.

Figure 122 shows nucleic acid SEQ. ID No.: 243 and amino acid SEQ. ID. No.: 244.

Figure 123 shows nucleic acid SEQ. ID No.: 245 and amino acid SEQ. ID. No.: 246.

Figure 124 shows nucleic acid SEQ. ID No.: 247 and amino acid SEQ. ID. No.: 248.

Figure 125 shows nucleic acid SEQ. ID No.: 249 and amino acid SEQ. ID. No.: 250.

Figure 126 shows nucleic acid SEQ. ID No.: 251 and amino acid SEQ. ID. No.: 252.

Figure 127 shows nucleic acid SEQ. ID No.: 253 and amino acid SEQ. ID. No.: 254.

Figure 128 shows nucleic acid SEQ. ID No.: 255 and amino acid SEQ. ID. No.: 256.

Figure 129 shows nucleic acid SEQ. ID No.: 257 and amino acid SEQ. ID. No.: 258.

Figure 130 shows nucleic acid SEQ. ID No.: 259 and amino acid SEQ. ID. No.: 260.

Figure 131 shows nucleic acid SEQ. ID No.: 261 and amino acid SEQ. ID. No.: 262.

Figure 132 shows nucleic acid SEQ. ID No.: 263 and amino acid SEQ. ID. No.: 264.

Figure 133 shows nucleic acid SEQ. ID No.: 265 and amino acid SEQ. ID. No.: 266.

Figure 134 shows nucleic acid SEQ. ID No.: 267 and amino acid SEQ. ID. No.: 268.

Figure 135 shows nucleic acid SEQ. ID No.: 269 and amino acid SEQ. ID. No.: 270.

Figure 136 shows nucleic acid SEQ. ID No.: 271 and amino acid SEQ. ID. No.: 272.

Figure 137 shows nucleic acid SEQ. ID No.: 273 and amino acid SEQ. ID. No.: 274.

Figure 138 shows nucleic acid SEQ. ID No.: 275 and amino acid SEQ. ID. No.: 276.

Figure 139 shows nucleic acid SEQ. ID No.: 277 and amino acid SEQ. ID. No.: 278.

Figure 140 shows nucleic acid SEQ. ID No.: 279 and amino acid SEQ. ID. No.: 280.

Figure 141 shows nucleic acid SEQ. ID No.: 281 and amino acid SEQ. ID. No.: 282.

Figure 142 shows nucleic acid SEQ. ID No.: 283 and amino acid SEQ. ID. No.: 284.

Figure 143 shows nucleic acid SEQ. ID No.: 285 and amino acid SEQ. ID. No.: 286.

Figure 144 shows nucleic acid SEQ. ID No.: 287 and amino acid SEQ. ID. No.: 288.

Figure 145 shows nucleic acid SEQ. ID No.: 289 and amino acid SEQ. ID. No.: 290.

Figure 146 shows nucleic acid SEQ. ID No.: 291 and amino acid SEQ. ID. No.: 292.

Figure 147 shows nucleic acid SEQ. ID No.: 293 and amino acid SEQ. ID. No.: 294.

Figure 148 shows nucleic acid SEQ. ID No.: 295 and amino acid SEQ. ID. No.: 296.

Figure 149 shows nucleic acid SEQ. ID No.: 297 and amino acid SEQ. ID. No.: 298.

Figure 151 shows a comparison of Sequence Groups.

Figure 152 illustrates alignment of full length clones.

Figure 153 shows a procedure used for cloning of cytochrome p450 cDNA fragments by PCR

### DETAILED DESCRIPTION

#### DEFINITIONS

Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. Singleton et al. (1994) Dictionary of Microbiology and Molecular Biology, second edition, John Wiley and Sons (New York) provides one of skill with a general dictionary of many of the terms used in this invention. All patents and publications referred to herein are incorporated by reference herein. For purposes of the present invention, the following terms are defined below.

"Enzymatic activity" is meant to include demethylation, hydroxylation, epoxidation, N-oxidation, sulfoxidation, N-, S-, and O- dealkylations, desulfation, deamination, and reduction of azo, nitro, and N-oxide groups. The term "nucleic acid" refers to a deoxyribonucleotide or ribonucleotide polymer in either

single- or double-stranded form, or sense or anti-sense, and unless otherwise limited, encompasses known analogues of natural nucleotides that hybridize to nucleic acids in a manner similar to naturally occurring nucleotides. Unless otherwise indicated, a particular nucleic acid sequence includes the complementary sequence thereof.

The terms "operably linked", "in operable combination", and "in operable order" refer to functional linkage between a nucleic acid expression control sequence (such as a promoter, signal sequence, or array of transcription factor binding sites) and a second nucleic acid sequence, wherein the expression control sequence affects transcription and/or translation of the nucleic acid corresponding to the second sequence.

The term "recombinant" when used with reference to a cell indicates that the cell replicates a heterologous nucleic acid, expresses said nucleic acid or expresses a peptide, heterologous peptide, or protein encoded by a heterologous nucleic acid. Recombinant cells can express genes or gene fragments in either the sense or antisense form that are not found within the native (non-recombinant) form of the cell. Recombinant cells can also express genes that are found in the native form of the cell, but wherein the genes are modified and re-introduced into the cell by artificial means.

A "structural gene" is that portion of a gene comprising a DNA segment encoding a protein, polypeptide or a portion thereof, and excluding the 5' sequence which

drives the initiation of transcription. The structural gene may alternatively encode a nontranslatable product. The structural gene may be one which is normally found in the cell or one which is not normally found in the cell or cellular location wherein it is introduced, in which case it is termed a "heterologous gene". A heterologous gene may be derived in whole or in part from any source known to the art, including a bacterial genome or episome, eukaryotic, nuclear or plasmid DNA, cDNA, viral DNA or chemically synthesized DNA. A structural gene may contain one or more modifications that could effect biological activity or its characteristics, the biological activity or the chemical structure of the expression product, the rate of expression or the manner of expression control. Such modifications include, but are not limited to, mutations, insertions, deletions and substitutions of one or more nucleotides. The structural gene may constitute an uninterrupted coding sequence or it may include one or more introns, bounded by the appropriate splice junctions. The structural gene may be translatable or non-translatable, including in an anti-sense orientation. The structural gene may be a composite of segments derived from a plurality of sources and from a plurality of gene sequences (naturally occurring or synthetic, where synthetic refers to DNA that is chemically synthesized).

"Derived from" is used to mean taken, obtained, received, traced, replicated or descended from a source (chemical and/or biological). A derivative may be

produced by chemical or biological manipulation (including, but not limited to, substitution, addition, insertion, deletion, extraction, isolation, mutation and replication) of the original source.

"Chemically synthesized", as related to a sequence of DNA, means that portions of the component nucleotides were assembled in vitro. Manual chemical synthesis of DNA may be accomplished using well established procedures (Caruthers, Methodology of DNA and RNA Sequencing, (1983), Weissman (ed.), Praeger Publishers, New York, Chapter 1); automated chemical synthesis can be performed using one of a number of commercially available machines.

Optimal alignment of sequences for comparison may be conducted by the local homology algorithm of Smith and Waterman, Adv. Appl. Math. 2:482 (1981), by the homology alignment algorithm of Needleman and Wunsch, J. Mol. Biol. 48:443 (1970), by the search for similarity method of Pearson and Lipman Proc. Natl. Acad. Sci. (U.S.A.) 85: 2444 (1988), by computerized implementations of these algorithms (GAP, BESTFIT, FASTA, and TFASTA in the Wisconsin Genetics Software Package, Genetics Computer Group, 575 Science Dr., Madison, Wis.), or by inspection.

The NCBI Basic Local Alignment Search Tool (BLAST) (Altschul et al., 1990) is available from several sources, including the National Center for Biological Information (NCBI, Bethesda, Md.) and on the Internet, for use in connection with the sequence analysis programs

blastp, blastn, blastx, tblastn and tblastx. It can be accessed at <http://www.ncbi.nlm.nih.gov/BLAST/>. A description of how to determine sequence identity using this program is available at [http://www.ncbi.nlm.nih.gov/BLAST/blast\\_help.html](http://www.ncbi.nlm.nih.gov/BLAST/blast_help.html).

The terms "substantial amino acid identity" or "substantial amino acid sequence identity" as applied to amino acid sequences and as used herein denote a characteristic of a polypeptide, wherein the peptide comprises a sequence that has at least 70 percent sequence identity, preferably 80 percent amino acid sequence identity, more preferably 90 percent amino acid sequence identity, and most preferably at least 99 to 100 percent sequence identity as compared to a reference group over region corresponding to the first amino acid following the cytochrome p450 motif GXRXCX(G/A) to the stop codon of the translated peptide.

The terms "substantial nucleic acid identity" or "substantial nucleic acid sequence identity" as applied to nucleic acid sequences and as used herein denote a characteristic of a polynucleotide sequence, wherein the polynucleotide comprises a sequence that has at least 75 percent sequence identity, preferably 81 percent amino acid sequence identity, more preferably at least 91 percent sequence identity, and most preferably at least 99 to 100 percent sequence identity as compared to a reference group over region corresponding to the first

nucleic acid following the cytochrome p450 motif GXRXCX(G/A) to the stop codon of the translated peptide.

Another indication that nucleotide sequences are substantially identical is if two molecules hybridize to each other under stringent conditions. Stringent conditions are sequence-dependent and will be different in different circumstances. Generally, stringent conditions are selected to be about 5°C to about 20°C, usually about 10°C to about 15°C, lower than the thermal melting point ( $T_m$ ) for the specific sequence at a defined ionic strength and pH. The  $T_m$  is the temperature (under defined ionic strength and pH) at which 50% of the target sequence hybridizes to a matched probe. Typically, stringent conditions will be those in which the salt concentration is about 0.02 molar at pH 7 and the temperature is at least about 60°C. For instance in a standard Southern hybridization procedure, stringent conditions will include an initial wash in 6xSSC at 42 °C followed by one or more additional washes in 0.2xSSC at a temperature of at least about 55°C, typically about 60°C and often about 65°C.

Nucleotide sequences are also substantially identical for purposes of this invention when the polypeptides and/or proteins which they encode are substantially identical. Thus, where one nucleic acid sequence encodes essentially the same polypeptide as a second nucleic acid sequence, the two nucleic acid sequences are substantially identical, even if they would

not hybridize under stringent conditions due to degeneracy permitted by the genetic code (see, Darnell et al. (1990) Molecular Cell Biology, Second Edition Scientific American Books W. H. Freeman and Company New York for an explanation of codon degeneracy and the genetic code). Protein purity or homogeneity can be indicated by a number of means well known in the art, such as polyacrylamide gel electrophoresis of a protein sample, followed by visualization upon staining. For certain purposes high resolution may be needed and HPLC or a similar means for purification may be utilized.

As used herein, the term "vector" is used in reference to nucleic acid molecules that transfer DNA segment(s) into a cell. A vector may act to replicate DNA and may reproduce independently in a host cell. The term "vehicle" is sometimes used interchangeably with "vector." The term "expression vector" as used herein refers to a recombinant DNA molecule containing a desired coding sequence and appropriate nucleic acid sequences necessary for the expression of the operably linked coding sequence in a particular host organism. Nucleic acid sequences necessary for expression in prokaryotes usually include a promoter, an operator (optional), and a ribosome binding site, often along with other sequences. Eucaryotic cells are known to utilize promoters, enhancers, and termination and polyadenylation signals.

For the purpose of regenerating complete genetically engineered plants with roots, a nucleic acid may be inserted into plant cells, for example, by any technique such as in vivo inoculation or by any of the known in vitro tissue culture techniques to produce transformed plant cells that can be regenerated into complete plants. Thus, for example, the insertion into plant cells may be by in vitro inoculation by pathogenic or non-pathogenic *A. tumefaciens*. Other such tissue culture techniques may also be employed.

"Plant tissue" includes differentiated and undifferentiated tissues of plants, including, but not limited to, roots, shoots, leaves, pollen, seeds, tumor tissue and various forms of cells in culture, such as single cells, protoplasts, embryos and callus tissue. The plant tissue may be *in planta* or in organ, tissue or cell culture.

"Plant cell" as used herein includes plant cells *in planta* and plant cells and protoplasts in culture.

"cDNA" or "complementary DNA" generally refers to a single stranded DNA molecule with a nucleotide sequence that is complementary to an RNA molecule. cDNA is formed by the action of the enzyme reverse transcriptase on an RNA template.

#### STRATEGIES FOR OBTAINING NUCLEIC ACID SEQUENCES

In accordance with the present invention, RNA was extracted from Nicotiana tissue of converter and non-converter Nicotiana lines. The extracted RNA was then used to create cDNA. Nucleic acid sequences of the present invention were then generated using two strategies.

In the first strategy, the poly A enriched RNA was extracted from plant tissue and cDNA was made by reverse transcription PCR. The single strand cDNA was then used to create p450 specific PCR populations using degenerate primers plus a oligo d(T) reverse primer. The primer design was based on the highly conserved motifs of p450. Examples of specific degenerate primers are set forth in Figure 1. Sequence fragments from plasmids containing appropriate size inserts were further analyzed. These size inserts typically ranged from about 300 to about 800 nucleotides depending on which primers were used.

In a second strategy, a cDNA library was initially constructed. The cDNA in the plasmids was used to create p450 specific PCR populations using degenerate primers plus T7 primer on plasmid as reverse primer. As in the first strategy, sequence fragments from plasmids containing appropriate size inserts were further analyzed.

Nicotiana plant lines known to produce high levels of nornicotine (converter) and plant lines having

undetectable levels of nornicotine may be used as starting materials.

Leaves can then be removed from plants and treated with ethylene to activate p450 enzymatic activities defined herein. Total RNA is extracted using techniques known in the art. cDNA fragments can then be generated using PCR (RT-PCR) with the oligo d(T) primer as described in Figure 153. The cDNA library can then be constructed more fully described in examples herein.

The conserved region of p450 type enzymes can be used as a template for degenerate primers (Figure 75). Using degenerate primers, p450 specific bands can be amplified by PCR. Bands indicative for p450 like enzymes can be identified by DNA sequencing. PCR fragments can be characterized using BLAST search, alignment or other tools to identify appropriate candidates.

Sequence information from identified fragments can be used to develop PCR primers. These primers in combination of plasmid primers in cDNA library were used to clone full length p450 genes. Large-scale Southern reverse analysis was conducted to examine the differential expression for all fragment clones obtained and in some cases full length clones. In this aspect of the invention, these large-scale reverse Southern assays can be conducted using labeled total cDNA's from

different tissues as a probe to hybridize with cloned DNA fragments in order to screen all cloned inserts.

Nonradioactive and radioactive ( $P^{32}$ ) Northern blotting assays were also used to characterize clones p450 fragments and full length clones.

Peptide specific antibodies were made against several full-length clones by deriving their amino acid sequence and selecting peptide regions that were antigenic and unique relative to other clones. Rabbit antibodies were made to synthetic peptides conjugated to a carrier protein. Western blotting analyses or other immunological methods were performed on plant tissue using these antibodies.

Nucleic acid sequences identified as described above can be examined by using virus induced gene silencing technology (VIGS, Baulcombe, Current Opinions in Plant Biology, 1999, 2:109-113).

Peptide specific antibodies were made for several full-length clones by deriving their amino acid sequence and selecting peptide regions that were potentially antigenic and were unique relative to other clones. Rabbit antibodies were made to synthetic peptides conjugated to a carrier protein. Western blotting analyses were performed using these antibodies.

In another aspect of the invention, interfering RNA technology (RNAi) is used to further characterize cytochrome p450 enzymatic activities in Nicotiana plants of the present invention. The following references which describe this technology are incorporated by reference herein, Smith et al., Nature, 2000, 407:319-320; Fire et al., Nature, 1998, 391:306- 311; Waterhouse et al., PNAS, 1998, 95:13959-13964; Stalberg et al., Plant Molecular Biology, 1993, 23:671- 683; Baulcombe, Current Opinions in Plant Biology, 1999, 2:109-113; and Brigneti et al., EMBO Journal, 1998, 17(22):6739-6746. Plants may be transformed using RNAi techniques, antisense techniques, or a variety of other methods described.

Several techniques exist for introducing foreign genetic material into plant cells, and for obtaining plants that stably maintain and express the introduced gene. Such techniques include acceleration of genetic material coated onto microparticles directly into cells (US Patents 4,945,050 to Cornell and 5,141,131 to DowElanco). Plants may be transformed using Agrobacterium technology, see US Patent 5,177,010 to University of Toledo, 5,104,310 to Texas A&M, European Patent Application 0131624B1, European Patent Applications 120516, 159418B1, European Patent Applications 120516, 159418B1 and 176,112 to Schilperoot, US Patents 5,149,645, 5,469,976, 5,464,763 and 4,940,838 and 4,693,976 to Schilperoot, European Patent Applications 116718, 290799, 320500 all to MaxPlanck, European Patent Applications 604662 and 627752 to Japan

Nicotiana, European Patent Applications 0267159, and 0292435 and US Patent 5,231,019 all to Ciba Geigy, US Patents 5,463,174 and 4,762,785 both to Calgene, and US Patents 5,004,863 and 5,159,135 both to Agracetus. Other transformation technology includes whiskers technology, see U.S. Patents 5,302,523 and 5,464,765 both to Zeneca. Electroporation technology has also been used to transform plants, see WO 87/06614 to Boyce Thompson Institute, 5,472,869 and 5,384,253 both to Dekalb, WO9209696 and WO9321335 both to PGS. All of these transformation patents and publications are incorporated by reference. In addition to numerous technologies for transforming plants, the type of tissue which is contacted with the foreign genes may vary as well. Such tissue would include but would not be limited to embryogenic tissue, callus tissue type I and II, hypocotyl, meristem, and the like. Almost all plant tissues may be transformed during dedifferentiation using appropriate techniques within the skill of an artisan.

Foreign genetic material introduced into a plant may include a selectable marker. The preference for a particular marker is at the discretion of the artisan, but any of the following selectable markers may be used along with any other gene not listed herein which could function as a selectable marker. Such selectable markers include but are not limited to aminoglycoside phosphotransferase gene of transposon Tn5 (Aph II) which encodes resistance to the antibiotics kanamycin, neomycin and G418, as well as those genes which code for

resistance or tolerance to glyphosate; hygromycin; methotrexate; phosphinothricin (bar); imidazolinones, sulfonylureas and triazolopyrimidine herbicides, such as chlorosulfuron; bromoxynil, dalapon and the like.

In addition to a selectable marker, it may be desirable to use a reporter gene. In some instances a reporter gene may be used without a selectable marker. Reporter genes are genes which are typically not present or expressed in the recipient organism or tissue. The reporter gene typically encodes for a protein which provide for some phenotypic change or enzymatic property. Examples of such genes are provided in K. Weising et al. Ann. Rev. Genetics, 22, 421 (1988), which is incorporated herein by reference. Preferred reporter genes include without limitation glucuronidase (GUS) gene and GFP genes.

Once introduced into the plant tissue, the expression of the structural gene may be assayed by any means known to the art, and expression may be measured as mRNA transcribed, protein synthesized, or the amount of gene silencing that occurs (see U.S. Patent No. 5,583,021 which is hereby incorporated by reference). Techniques are known for the in vitro culture of plant tissue, and in a number of cases, for regeneration into whole plants (EP Appln No. 88810309.0). Procedures for transferring the introduced expression complex to commercially useful cultivars are known to those skilled in the art.

Once plant cells expressing the desired level of p450 enzyme are obtained, plant tissues and whole plants can be regenerated therefrom using methods and techniques well-known in the art. The regenerated plants are then reproduced by conventional means and the introduced genes can be transferred to other strains and cultivars by conventional plant breeding techniques.

The following examples illustrate methods for carrying out the invention and should be understood to be illustrative of, but not limiting upon, the scope of the invention which is defined in the appended claims.

### EXAMPLES

#### EXAMPLE I: DEVELOPMENT OF PLANT TISSUE AND ETHYLENE TREATMENT

##### Plant Growth

Plants were seeded in pots and grown in a greenhouse for 4 weeks. The 4 week old seedlings were transplanted into individual pots and grown in the greenhouse for 2 months. The plants were watered 2 times a day with water containing 150ppm NPK fertilizer during growth. The expanded green leaves were detached from plants to do the ethylene treatment described below.

##### Cell Line 78379

Tobacco line 78379, which is a burley tobacco line released by the University of Kentucky was used as a source of plant material. One hundred plants were cultured as standard in the art of growing tobacco and transplanted and tagged with a distinctive number (1-100). Fertilization and field management were conducted as recommended.

Three quarters of the 100 plants converted between 20 and 100% of the nicotine to nornicotine. One quarter of the 100 plants converted less than 5% of the nicotine to nornicotine. Plant number 87 had the least conversion (2%) while plant number 21 had 100% conversion. Plants converting less than 3% were classified as non-converters. Self-pollinated seed of plant number 87 and plant number 21, as well as crossed (21 x 87 and 87 x 21) seeds were made to study genetic and phenotypic differences. Plants from selfed 21 were converters, and 99% of selfs from 87 were non-converters. The other 1% of the plants from 87 showed low conversion (5-15%). Plants from reciprocal crosses were all converters.

Cell Line 4407

Nicotiana line 4407, which is a burley line was used as a source of plant material. Uniform and representative plants (100) were selected and tagged. Of the 100 plants 97 were non-converters and three were converters. Plant number 56 had the least amount of conversion (1.2%) and plant number 58 had the highest level of conversion (96%). Self-pollenated seeds and crossed seeds were made with these two plants.

Plants from selfed-58 segregated with 3:1 converter to non-converter ratio. Plants 58-33 and 58-25, were identified as homozygous converter and nonconverter plant lines, respectively. The stable conversion of 58-33 was confirmed by analysis of its progenies of next generation.

Cell Line PBLB01

PBLB01 is a burley line developed by ProfiGen, Inc. and was used as a source of plant material. The converter plant was selected from foundation seeds of PBLB01.

Ethylene Treatment Procedures

Green leaves were detached from 2-3 month greenhouse grown plants and sprayed with 0.3% ethylene solution (Prep brand Ethephon (Rhone-Poulenc)). Each sprayed leaf

was hung in a curing rack equipped with humidifier and covered with plastic. During the treatment, the sample leaves were periodically sprayed with the ethylene solution. Approximately 24-48 hour post ethylene treatment, leaves were collected for RNA extraction. Another sub-sample was taken for metabolic constituent analysis to determine the concentration of leaf metabolites and more specific constituents of interest such as a variety of alkaloids.

As an example, alkaloids analysis could be performed as follows. Samples (0.1 g) were shaken at 150 rpm with 0.5 ml 2N NaOH, and a 5 ml extraction solution which contained quinoline as an internal standard and methyl t-butyl ether. Samples were analyzed on a HP 6890 GC equipped with a FID detector. A temperature of 250°C was used for the detector and injector. An HP column (30m-0.32mm-1m) consisting of fused silica crosslinked with 5% phenol and 95% methyl silicon was used at a temperature gradient of 110-185 °C at 10°C per minute. The column was operated at 100°C with a flow rate of 1.7cm<sup>3</sup>min<sup>-1</sup> with a split ratio of 40:1 with a 2.1 injection volume using helium as the carrier gas.

#### EXAMPLE 2: RNA ISOLATION

For RNA extractions, middle leaves from 2 month old greenhouse grown plants were treated with ethylene as described. The 0 and 24-48 hours samples were used for RNA extraction. In some cases, leaf samples under the

senescence process were taken from the plants 10 days post flower-head removal. These samples were also used for extraction. Total RNA was isolated using Rneasy Plant Mini Kit® (Qiagen, Inc., Valencia, California) following manufacturer's protocol.

The tissue sample was ground under liquid nitrogen to a fine powder using a DEPC treated mortar and pestle. Approximately 100 milligrams of ground tissue were transferred to a sterile 1.5 ml eppendorf tube. This sample tube was placed in liquid nitrogen until all samples were collected. Then, 450µl of Buffer RLT as provided in the kit (with the addition of Mercaptoethanol) was added to each individual tube. The sample was vortexed vigorously and incubated at 56° C for 3 minutes. The lysate was then, applied to the QIAshredder™ spin column sitting in a 2-ml collection tube, and centrifuged for 2 minutes at maximum speed. The flow through was collected and 0.5 volume of ethanol was added to the cleared lysate. The sample is mixed well and transferred to an Rneasy® mini spin column sitting in a 2 ml collection tube. The sample was centrifuged for 1 minute at 10,000rpm. Next, 700µl of buffer RW1 was pipetted onto the Rneasy® column and centrifuged for 1 minute at 10,000rpm. Buffer RPE was pipetted onto the Rneasy® column in a new collection tube and centrifuged for 1 minute at 10,000 rpm. Buffer RPE was again, added to the Rneasy® spin column and

centrifuged for 2 minutes at maximum speed to dry the membrane. To eliminate any ethanol carry over, the membrane was placed in a separate collection tube and centrifuged for an additional 1 minute at maximum speed. The Rneasy® column was transferred into a new 1.5 ml collection tube, and 40 µl of Rnase-free water was pipetted directly onto the Rneasy® membrane. This final elute tube was centrifuged for 1 minute at 10,000rpm. Quality and quantity of total RNA was analyzed by denatured formaldehyde gel and spectrophotometer.

Poly(A)RNA was isolated using Oligotex™ poly A+ RNA purification kit (Qiagen Inc.) following manufacture's protocol. About 200 µg total RNA in 250 µl maximum volume was used. A volume of 250µl of Buffer OBB and 15 µl of Oligotex™ suspension was added to the 250 µl of total RNA. The contents were mixed thoroughly by pipetting and incubated for 3 minutes at 70°C on a heating block. The sample was then, placed at room temperature for approximately 20 minutes. The oligotex:mRNA complex was pelleted by centrifugation for 2 minutes at maximum speed. All but 50 µl of the supernatant was removed from the microcentrifuge tube. The sample was treated further by OBB buffer. The oligotex:mRNA pellet was resuspended in 400 µl of Buffer OW2 by vortexing. This mix was transferred onto a small spin column placed in a new tube and centrifuged for 1 minute at maximum speed. The spin column was transferred to a new tube and an additional 400 µl of Buffer OW2 was

added to the column. The tube was then centrifuged for 1 minute at maximum speed. The spin column was transferred to a final 1.5ml microcentrifuge tube. The sample was eluted with 60  $\mu$ l of hot (70°C) Buffer OEB. Poly A product was analyzed by denatured formaldehyde gels and spectrophotometric analysis.

### EXAMPLE 3: REVERSE TRANSCRIPTION-PCR

First strand cDNA was produced using SuperScript reverse transcriptase following manufacturer's protocol (Invitrogen, Carlsbad, California). The poly A+ enriched RNA/oligo dT primer mix consisted of less than 5  $\mu$ g of total RNA, 1  $\mu$ l of 10mM dNTP mix, 1  $\mu$ l of Oligo d(T)<sub>12-18</sub> (0.5 $\mu$ g/ $\mu$ l), and up to 10  $\mu$ l of DEPC-treated water. Each sample was incubated at 65°C for 5 minutes, then placed on ice for at least 1 minute. A reaction mixture was prepared by adding each of the following components in order: 2  $\mu$ l 10X RT buffer, 4  $\mu$ l of 25 mM MgCl<sub>2</sub>, 2 $\mu$ l of 0.1 M DTT, and 1  $\mu$ l of RNase OUT Recombinant RNase Inhibitor. An addition of 9  $\mu$ l of reaction mixture was pipetted to each RNA/primer mixture and gently mixed. It was incubated at 42°C for 2 minutes and 1  $\mu$ l of Super Script II™ RT was added to each tube. The tube was incubated for 50 minutes at 42°C. The reaction was terminated at 70°C for 15 minutes and chilled on ice. The sample was collected by centrifugation and 1  $\mu$ l of RNase H was added to each tube and incubated for 20 minutes at 37°C. The second PCR was carried out with 200 pmoles of forward primer

(degenerate primers as in Figure 75, SEQ.ID Nos. 149-156) and 100 pmoles reverse primer (mix of 18nt oligo d(T) followed by 1 random base).

Reaction conditions were 94°C for 2 minutes and then performed 40 cycles of PCR at 94°C for 1 minute, 45° to 60°C for 2 minutes, 72°C for 3 minutes with a 72°C extension for an extra 10 min.

Ten microliters of the amplified sample were analyzed by electrophoresis using a 1% agarose gel. The correct size fragments were purified from agarose gel.

#### EXAMPLE 4: GENERATION OF PCR FRAGMENT POPULATIONS

PCR fragments from Example 3 were ligated into a pGEM-T® Easy Vector (Promega, Madison, Wisconsin) following manufacturer's instructions. The ligated product was transformed into JM109 competent cells and plated on LB media plates for blue/white selection. Colonies were selected and grown in a 96 well plate with 1.2 ml of LB media overnight at 37°C. Frozen stock was generated for all selected colonies. Plasmid DNA from plates were purified using Beckman's Biomeck 2000 miniprep robotics with Wizard SV Miniprep® kit (Promega). Plasmid DNA was eluted with 100µl water and stored in a 96 well plate. Plasmids were digested by

EcoR1 and were analyzed using 1% agarose gel to confirm the DNA quantity and size of inserts. The plasmids containing a 400-600 bp insert were sequenced using an CEQ 2000 sequencer (Beckman, Fullerton, California). The sequences were aligned with GenBank database by BLAST search. The p450 related fragments were identified and further analyzed. Alternatively, p450 fragments were isolated from subtraction libraries. These fragments were also analyzed as described above.

#### EXAMPLE 5: CONSTRUCTION OF CDNA LIBRARY

A cDNA library was constructed by preparing total RNA from ethylene treated leaves as follows. First, total RNA was extracted from ethylene treated leaves of tobacco line 58-33 using a modified acid phenol and chloroform extraction protocol. Protocol was modified to use one gram of tissue that was ground and subsequently vortexed in 5 ml of extraction buffer (100 mM Tris-HCl, pH 8.5; 200 mM NaCl; 10mM EDTA; 0.5% SDS) to which 5 ml phenol (pH5.5) and 5 ml chloroform was added. The extracted sample was centrifuged and the supernatant was saved. This extraction step was repeated 2-3 more times until the supernatant appeared clear. Approximately 5 ml of chloroform was added to remove trace amounts of phenol. RNA was precipitated from the combined supernatant fractions by adding a 3-fold volume of ETOH and 1/10 volume of 3M NaOAc (pH5.2) and storing at -20°C for 1 hour. After transferring to

a Corex glass container the RNA fraction was centrifuged at 9,000 RPM for 45 minutes at 4°C. The pellet was washed with 70% ethanol and spun for 5 minutes at 9,000 RPM at 4°C. After drying the pellet, the pelleted RNA was dissolved in 0.5 ml RNase free water. The pelleted RNA was dissolved in 0.5 ml RNase free water. The quality and quantity of total RNA was analyzed by denatured formaldehyde gel and spectrophotometer, respectively.

The resultant total RNA was isolated for poly A+ RNA using an Oligo(dT) cellulose protocol (Invitrogen) and Microcentrifuge spin columns (Invitrogen) by the following protocol. Approximately twenty mg of total RNA was subjected to twice purification to obtain high quality poly A+ RNA. Poly A+ RNA product was analyzed by performing denatured formaldehyde gel and subsequent RT-PCR of known full-length genes to ensure high quality of mRNA.

Next, poly A+ RNA was used as template to produce a cDNA library employing cDNA synthesis kit, ZAP-cDNA® synthesis kit, and ZAP-cDNA® Gigapack® III gold cloning kit (Stratagene, La Jolla, California). The method involved following the manufacture's protocol as specified. Approximately 8 µg of poly A+ RNA was used to construct cDNA library. Analysis of the primary library revealed about  $2.5 \times 10^6$  -  $1 \times 10^7$  pfu. A quality background test of the library was completed by

complementation assays using IPTG and X-gal, where recombinant plaques was expressed at more than 100-fold above the background reaction.

A more quantitative analysis of the library by random PCR showed that average size of insert cDNA was approximately 1.2 kb. The method used a two-step PCR method as followed. For the first step, reverse primers were designed based on the preliminary sequence information obtained from p450 fragments. The designed reverse primers and T3 (forward) primers were used amplify corresponding genes from the cDNA library. PCR reactions were subjected to agarose electrophoresis and the corresponding bands of high molecular weight were excised, purified, cloned and sequenced. In the second step, new primers designed from 5'UTR or the start coding region of p450 as the forward primers together with the reverse primers (designed from 3'UTR of p450) were used in the subsequent PCR to obtain full-length p450 clones.

The p450 fragments were generated by PCR amplification from the constructed cDNA library as described in Example 3 with the exception of the reverse primer. The T7 primer located on the plasmid downstream of cDNA inserts (see Figure 75) was used as a reverse primer. PCR fragments were isolated, cloned and sequenced as described in Example 4.

Full-length p450 genes were isolated by PCR method

from constructed cDNA library. Gene specific reverse primers (designed from the downstream sequence of p450 fragments) and a forward primer (T3 on library plasmid) were used to clone the full length genes. PCR fragments were isolated, cloned and sequenced. If necessary, second step PCR was applied. In the second step, new forward primers designed from 5'UTR of cloned p450s together with the reverse primers designed from 3'UTR of p450 clones were used in the subsequent PCR reactions to obtain full-length p450 clones. The clones were subsequently sequenced.

EXAMPLE 6: CHARACTERIZATION OF CLONED FRAGMENTS -  
REVERSE SOUTHERN BLOTTING ANALYSIS

Nonradioactive large scale reverse southern blotting assays were performed on all p450 clones identified in above examples to detect the differential expression. It was observed that the level of expression among different p450 clusters was very different. Further real time detection was conducted on those with high expression.

Nonradioactive Southern blotting procedures were conducted as follows.

- 1) Total RNA was extracted from ethylene treated and nontreated converter (58-33) and nonconverter (58-25) leaves using the Qiagen Rnaeasy kit as described in Example 2.

2) Probe was produced by biotin-tail labeling a single strand cDNA derived from poly A+ enriched RNA generated in above step. This labeled single strand cDNA was generated by RT-PCR of the converter and nonconverter total RNA (Invitrogen) as described in Example 3 with the exception of using biotinylated oligo dT as a primer (Promega). These were used as a probe to hybridize with cloned DNA.

3) Plasmid DNA was digested with restriction enzyme EcoRI and run on agarose gels. Gels were simultaneously dried and transferred to two nylon membranes (Biodyne B®). One membrane was hybridized with converter probe and the other with nonconverter probe. Membranes were UV-crosslinked (auto crosslink setting, 254 nm, Stratagene, Stratalinker) before hybridization.

Alternatively, the inserts were PCR amplified from each plasmid using the sequences located on both arms of p-GEM plasmid, T3 and SP6, as primers. The PCR products were analyzed by running on a 96 well Ready-to-run agarose gels. The confirmed inserts were dotted on two nylon membranes. One membrane was hybridized with converter probe and the other with nonconverter probe.

4) The membranes were hybridized and washed following manufacture's instruction with the

modification of washing stringency (Enzo MaxSence™ kit, Enzo Diagnostics, Inc, Farmingdale, NY). The membranes were prehybridized with hybridization buffer (2x SSC buffered formamide, containing detergent and hybridization enhancers) at 42°C for 30 min and hybridized with 10µl denatured probe overnight at 42°C. The membranes then were washed in 1X hybridization wash buffer 1 time at room temperature for 10 min and 4 times at 68°C for 15 min. The membranes were ready for the detection.

5) The washed membranes were detected by alkaline phosphatase labeling followed by NBT/BCIP colometric detection as described in manufacture's detection procedure (Enzo Diagnostics, Inc.). The membranes were blocked for one hour at room temperature with 1x blocking solution, washed 3 times with 1X detection reagents for 10 min, washed 2 times with 1x predevelopment reaction buffer for 5 min and then developed the blots in developing solution for 30-45 min until the dots appear. All reagents were provided by manufacture (Enzo Diagnostics, Inc). In Addition, large scale reverse Southern assay was also performed using KPL southern hybridization and detection kit™ following manufacturer's instruction (KPL, Gaithersburg, Maryland).

EXAMPLE 7: CHARACTERIZATION OF CLONES - NORTHERN BLOT ANALYSIS

Alternative to Southern Blot analysis, some membranes were hybridized and detected as described in the example of Northern blotting assays. Northern Hybridization was used to detect mRNA differentially expressed in Nicotiana as follows.

A random priming method was used to prepare probes from cloned p450 (Megaprime™ DNA Labelling Systems, Amersham Biosciences).

The following components were mixed: 25ng denatured DNA template; 4ul of each unlabeled dTTP, dGTP and dCTP; 5ul of reaction buffer; P<sup>32</sup>-labelled dATP and 2ul of Klenow I; and H<sub>2</sub>O, to bring the reaction to 50ul. The mixture was incubated in 37°C for 1-4 hours, then stopped with 2ul of 0.5 M EDTA. The probe was denatured by incubating at 95°C for 5 minutes before use.

RNA samples were prepared from ethylene treated and non-treated fresh leaves of several pairs of tobacco lines. In some cases poly A<sup>+</sup> enriched RNA was used. Approximately 15µg total RNA or 1.8µg mRNA (methods of RNA and mRNA extraction as described in Example 5) were brought to equal volume with DEPC H<sub>2</sub>O (5-10 µl). The same volume of loading buffer (1 x MOPS; 18.5 % Formaldehyde; 50 % Formamide; 4 %

Ficoll400; Bromophenolblue) and 0.5  $\mu$ l EtBr (0.5  $\mu$ g/ $\mu$ l) were added. The samples were subsequently denatured in preparation for separation of the RNA by electrophoresis.

Samples were subjected to electrophoresis on a formaldehyde gel (1 % Agarose, 1 x MOPS, 0.6 M Formaldehyde) with 1XMOP buffer (0.4 M Morpholinopropanesulfonic acid; 0.1 M Na-acetate-3 x H<sub>2</sub>O; 10 mM EDTA; adjust to pH 7.2 with NaOH). RNA was transferred to a Hybond-N+ membrane (Nylon, Amersham Pharmacia Biotech) by capillary method in 10 X SSC buffer (1.5 M NaCl; 0.15 M Na-citrate) for 24 hours. Membranes with RNA samples were UV-crosslinked (auto crosslink setting, 254 nm, Stratagene, Stratalinker) before hybridization.

The membrane was prehybridized for 1-4 hours at 42°C with 5-10 ml prehybridization buffer (5 x SSC; 50 % Formamide; 5 x Denhardt's-solution; 1 % SDS; 100 $\mu$ g/ml heat-denatured sheared non- homologous DNA). Old prehybridization buffer was discarded, and new prehybridization buffer and probe were added. The hybridization was carried out over night at 42°C. The membrane was washed for 15 minutes with 2 x SSC at room temperature, followed by a wash with 2 x SSC.

A major focus of the invention was the discovery of novel genes that may be induced as a result of ethylene treatment or play a key role in tobacco leaf quality and constituents. As illustrated in the table below, Northern blots and reverse Southern Blot were useful in determining which genes were induced by ethylene treatment relative to non-induced plants. Interestingly, not all fragments were affected similarly in the converter and nonconverter. The cytochrome p450 fragments of interest were partially sequenced to determine their structural relatedness. This information was used to subsequently isolate and characterize full length gene clones of interest.

Fragments	Induced mRNA Expression Ethylene Treatment
	Converter
D56-AC7 (SEQ ID No: 35)	+
D56-AG11 (SEQ ID No: 31)	+
D56-AC12 (SEQ ID No: 45)	+
D70A-AB5 (SEQ ID No: 95)	+
D73-AC9 (SEQ ID No: 43)	+
D70A-AA12 (SEQ ID No: 131)	+
D73A-AG3 (SEQ ID No: 129)	+
D34-52 (SEQ ID No: 61)	+
D56-AG6 (SEQ ID No: 51)	+

Northern analysis was performed using full length clones on tobacco tissue obtained from converter and nonconverter burley lines that were induced by ethylene treatment. The purpose was to identify those full

length clones that showed elevated expression in ethylene induced converter lines relative to ethylene induced converter lines relative to ethylene induced nonconverter burley lines. By so doing, the functionality relationship of full length clones may be determined by comparing biochemical differences in leaf constituents between converter and nonconverter lines. As shown in table below, six clones showed significantly higher expression, as denoted by ++ and +++, in converter ethylene treated tissue than that of nonconverter treated tissue, denoted by +. All of these clones showed little or no expression in converter and nonconverter lines that were not ethylene treated.

Full Length Clones	Converter	Nonconverter
D101-BA2	++	+
D207-AA5	++	+
D208-AC8	+++	+
D237-AD1	++	+
D89-AB1	++	+
D90A-BB3	++	+

EXAMPLE 8: IMMUNODETECTION OF p450S ENCODED BY THE CLONED GENES

Peptide regions corresponding to 20-22 amino acids in length from three p450 clones were selected for 1) having lower or no homology to other clones and 2) having good hydrophilicity and antigenicity. The amino acid sequences

of the peptide regions selected from the respective p450 clones are listed below. The synthesized peptides were conjugated with KHL and then injected into rabbits. Antisera were collected 2 and 4 weeks after the 4<sup>th</sup> injection (Alpha Diagnostic Intl, Inc. San Antonio, TX).

D234-AD1 DIDGSKSKLVKAHRKIDEILG  
D90a-BB3 RDAFREKETFDENDVEELNY  
D89-AB1 FKNNGDEDRHFSQKLGLADKY

Antisera were examined for crossreactivity to target proteins from tobacco plant tissue by Western Blot analysis. Crude protein extracts were obtained from ethylene treated (0 to 40 hours) middle leaves of converter and nonconverter lines. Protein concentrations of the extracts were determined using RC DC Protein Assay Kit (BIO-RAD) following the manufacturer's protocol.

Two micrograms of protein were loaded onto each lane and the proteins separated on 10% - 20% gradient gels using the Laemmli SDS-PAGE system. The proteins were transferred from gels to PROTRAN® Nitrocellulose Transfer Membranes (Schleicher & Schuell) with the Trans-Blot® Semi-Dry cell (BIO-RAD). Target p450 proteins were detected and visualized with the ECL Advance™ Western Blotting Detection Kit (Amersham Biosciences). Primary antibodies against the synthetic-KLH conjugates were made in rabbits. Secondary antibody against rabbit IgG, coupled with peroxidase, was purchased from Sigma. Both primary and secondary antibodies were used at 1:1000 dilutions. Antibodies showed strong

reactivity to a single band on the Western Blots indicating that the antisera were monospecific to the target peptide of interest. Antisera were also crossreactive with synthetic peptides conjugated to KLH.

EXAMPLE 9: NUCLEIC ACID IDENTITY AND STRUCTURE RELATEDNESS OF ISOLATED NUCLEIC ACID FRAGMENTS

Over 100 cloned p450 fragments were sequenced in conjunction with Northern blot analysis to determine their structural relatedness. The approach used utilized forward primers based either of two common p450 motifs located near the carboxyl-terminus of the p450 genes. The forward primers corresponded to cytochrome p450 motifs FXPERF or GRRXCP(A/G) as denoted in Figure 1. The reverse primers used standard primers from either the plasmid, SP6 or T7 located on both arms of pGEM™ plasmid, or a poly A tail. The protocol used is described below.

Spectrophotometry was used to estimate the concentration of starting double stranded DNA following the manufacturer's protocol (Beckman Coulter). The template was diluted with water to the appropriate concentration, denatured by heating at 95° C for 2 minutes, and subsequently placed on ice. The sequencing reaction was prepared on ice using 0.5 to 10µl of denatured DNA template, 2 µl of 1.6 pmole of the forward primer, 8 µl of DTCS Quick Start Master Mix and the total volume brought to 20 µl with water. The thermocycling program consisted of 30 cycles of the follow cycle: 96° C for 20 seconds, 50° C for 20

seconds, and 60° C for 4 minutes followed by holding at 4° C.

The sequence was stopped by adding 5 µl of stop buffer (equal volume of 3M NaOAc and 100mM EDTA and 1 µl of 20 mg/ml glycogen). The sample was precipitated with 60 µl of cold 95% ethanol and centrifuged at 6000g for 6 minutes. Ethanol was discarded. The pellet was 2 washes with 200 µl of cold 70% ethanol. After the pellet was dry, 40 µl of SLS solution was added and the pellet was resuspended. A layer of mineral oil was over laid. The sample was then, placed on the CEQ 8000 Automated Sequencer for further analysis.

In order to verify nucleic acid sequences, nucleic acid sequence was re-sequenced in both directions using forward primers to the FXPERF or GRRXCP(A/G) region of the p450 gene or reverse primers to either the plasmid or poly A tail. All sequencing was performed at least twice in both directions.

The nucleic acid sequences of cytochrome p450 fragments were compared to each other from the coding region corresponding to the first nucleic acid after the region encoding the GRRXCP(A/G) motif through to the stop codon. This region was selected as an indicator of genetic diversity among p450 proteins. A large number of genetically distinct p450 genes, in excess of 70 genes, were observed, similar to that of other plant species. Upon comparison of nucleic acid sequences, it was found that the genes could be placed into distinct sequences groups based on their sequence identity. It was found that the best

unique grouping of p450 members was determined to be those sequences with 75% nucleic acid identity or greater (shown in Table I). Reducing the percentage identity resulted in significantly larger groups. A preferred grouping was observed for those sequences with 81% nucleic acid identity or greater, a more preferred grouping 91% nucleic acid identity or greater, and a most preferred grouping for those sequences 99% nucleic acid identity or greater. Most of the groups contained at least two members and frequently three or more members. Others were not repeatedly discovered suggesting that approach taken was able to isolated both low and high expressing mRNA in the tissue used.

Based on 75% nucleic acid identity or greater, two cytochrome p450 groups were found to contain nucleic acid sequence identity to previously tobacco cytochrome genes that genetically distinct from that within the group. Group 23, showed nucleic acid identity, within the parameters used for Table I, to prior GenBank sequences of GI:1171579 (CAA64635) and GI:14423327 (or AAK62346) by Czernic et al and Ralston et al, respectively. GI:1171579 had nucleic acid identity to Group 23 members ranging 96.9% to 99.5% identity to members of Group 23 while GI:14423327 ranged 95.4% to 96.9% identity to this group. The members of Group 31 had nucleic acid identity ranging from 76.7% to 97.8% identity to the GenBank reported sequence of GI:14423319 (AAK62342) by Ralston et al. None of the other p450 identity groups of Table 1 contained parameter identity, as used in Table 1, to Nicotiana p450s genes reported by

Ralston et al, Czernic et al., Wang et al or LaRosa and Smigocki.

As shown in Figure 76, consensus sequence with appropriate nucleic acid degenerate probes could be derived for group to preferentially identify and isolate additional members of each group from Nicotiana plants.

Table I: Nicotiana p450 Nucleic Acid Sequence Identity Groups

<u>GROUP</u>	<u>FRAGMENTS</u>
1	D58-BG7 (SEQ ID No.:1), D58-AB1 (SEQ ID No.:3); D58-BE4 (SEQ ID No.:7)
2	D56-AH7 (SEQ ID No.:9); D13a-5 (SEQ ID No.:11)
3	D56-AG10 (SEQ ID No.:13); D35-33 (SEQ ID No.:15); D34-62 (SEQ ID No.:17)
4	D56-AA7 (SEQ ID No.:19); D56-AE1 (SEQ ID No.:21); 185-BD3 (SEQ ID No.:143)
5	D35-BB7 (SEQ ID No.:23); D177-BA7 (SEQ ID No.:25); D56A-AB6 (SEQ ID No.:27); D144-AE2 (SEQ ID No.:29)
6	D56-AG11 (SEQ ID No.:31); D179-AA1 (SEQ ID No.:33)
7	D56-AC7 (SEQ ID No.:35); D144-AD1 (SEQ ID No.:37)
8	D144-AB5 (SEQ ID No.:39)
9	D181-AB5 (SEQ ID No.:41); D73-Ac9 (SEQ ID No.:43)
10	D56-AC12 (SEQ ID No.:45)
11	D58-AB9 (SEQ ID No.:47); D56-AG9 (SEQ ID No.:49); D56-AG6 (SEQ ID No.:51); D35-BG11 (SEQ ID No.:53); D35-42 (SEQ ID No.:55); D35-BA3 (SEQ ID No.:57); D34-57 (SEQ ID No.:59); D34-52 (SEQ ID No.:61); D34-25 (SEQ ID No.:63)
12	D56-AD10 (SEQ ID No.:65)
13	56-AA11 (SEQ ID No.:67)
14	D177-BD5 (SEQ ID No.:69); D177-BD7 (SEQ ID No.:83)

- 15 D56A-AG10 (SEQ ID No.:71); D58-BC5 (SEQ ID No.:73);  
D58-AD12 (SEQ ID No.:75)
- 16 D56-AC11 (SEQ ID No.:77); D35-39 (SEQ ID No.:79);  
D58-BH4 (SEQ ID No.:81); D56-AD6 (SEQ ID No.:87)
- 17 D73A-AD6 (SEQ ID No.:89); D70A-BA11 (SEQ ID No.:91)
- 18 D70A-AB5 (SEQ ID No.:95); D70A-AA8 (SEQ ID No.:97)
- 19 D70A-AB8 (SEQ ID No.:99); D70A-BH2 (SEQ ID No.:101);  
D70A-AA4 (SEQ ID No.:103)
- 20 D70A-BA1 (SEQ ID No.:105); D70A-BA9 (SEQ ID No.:107)
- 21 D70A-BD4 (SEQ ID No.:109)
- 22 D181-AC5 (SEQ ID No.:111); D144-AH1 (SEQ ID No.:113);  
D34-65 (SEQ ID No.:115)
- 23 D35-BG2 (SEQ ID No.:117)
- 24 D73A-AH7 (SEQ ID No.:119)
- 25 D58-AA1 (SEQ ID No.:121); D185-BC1 (SEQ ID No.:133);  
D185-BG2 (SEQ ID No.:135)
- 26 D73-AE10 (SEQ ID No.:123)
- 27 D56-AC12 (SEQ ID No.:125)
- 28 D177-BF7 (SEQ ID No.:127); D185-BE1 (SEQ ID No.:137);  
D185-BD2 (SEQ ID No.:139)
- 29 D73A-AG3 (SEQ ID No.:129)
- 30 D70A-AA12 (SEQ ID No.:131); D176-BF2 (SEQ ID No.:85)
- 31 D176-BC3 (SEQ ID No.:145)
- 32 D176-BB3 (SEQ ID No.: 147)

33 D186-AH4 (SEQ ID No.:5)

EXAMPLE 10: RELATED AMINO ACID SEQUENCE IDENTITY OF  
ISOLATED NUCLEIC ACID FRAGMENTS

The amino acid sequences of nucleic acid sequences obtained for cytochrome p450 fragments from Example 8 were deduced. The deduced region corresponded to the amino acid immediately after the GXRXCP(A/G) sequence motif to the end of the carboxyl-terminus, or stop codon. Upon comparison of sequence identity of the fragments, a unique grouping was observed for those sequences with 70% amino acid identity or greater. A preferred grouping was observed for those sequences with 80% amino acid identity or greater, more preferred with 90% amino acid identity or greater, and a most preferred grouping for those sequences 99% amino acid identity or greater. The groups and corresponding amino acid sequences of group members are shown in Figure 2. Several of the unique nucleic acid sequences were found to have complete amino acid identity to other fragments and therefore only one member with the identical amino acid was reported.

The amino acid identity for Group 19 of Table II corresponded to three distinct groups based on their nucleic acid sequences. The amino acid sequences of each group member and their identity is shown in Figure. 77. The amino acid differences are appropriated marked.

At least one member of each amino acid identity group was selected for gene cloning and functional studies using plants. In addition, group members that are differentially affected by ethylene treatment or other biological differences as assessed by Northern and Southern analysis were selected for gene cloning and functional studies. To assist in gene cloning, expression studies and whole plant evaluations, peptide specific antibodies will be prepared on sequence identity and differential sequence.

Table II: Nicotiana p450 Amino Acid Sequence Identity Groups

<u>GROUP</u>	<u>FRAGMENTS</u>
1	D58-BG7 (SEQ ID No.:2), D58-AB1 (SEQ ID No.:4)
2	D58-BE4 (SEQ ID No.:8)
3	D56-AH7 (SEQ ID No.:10); D13a-5 (SEQ ID No.:12)
4	D56-AG10 (SEQ ID No.:14); D34-62 (SEQ ID No.:18)
5	D56-AA7 (SEQ ID No.:20); D56-AE1 (SEQ ID No.:22); 185-BD3 (SEQ ID No.:144)
6	D35-BB7 (SEQ ID No.:24); D177-BA7 (SEQ ID No.:26); D56A-AB6 (SEQ ID No.:28); D144-AE2 (SEQ ID No.:30)
7	D56-AG11 (SEQ ID No.:32); D179-AA1 (SEQ ID No.:34)
8	D56-AC7 (SEQ ID No.:36); D144-AD1 (SEQ ID No.:38)
9	D144-AB5 (SEQ ID No.:40)
10	D181-AB5 (SEQ ID No.:42); D73-Ac9 (SEQ ID No.:44)
11	D56-AC12 (SEQ ID No.:46)
12	D58-AB9 (SEQ ID No.:48); D56-AG9 (SEQ ID No.:50); D56-AG6 (SEQ ID No.:52); D35-BG11 (SEQ ID No.:54); D35-42 (SEQ ID No.:56); D35-BA3 (SEQ ID No.:58); D34-57 (SEQ ID No.:60); D34-52 (SEQ ID No.:62)
13	D56AD10 (SEQ ID No.:66)
14	56-AA11 (SEQ ID No.:68)
15	D177-BD5 (SEQ ID No.:70); D177-BD7 (SEQ ID No.:84)

16 D56A-AG10 (SEQ ID No.:72); D58-BC5 (SEQ ID No.:74);  
D58-AD12 (SEQ ID No.:76)

17 D56-AC11 (SEQ ID No.:78); D56-AD6 (SEQ ID No.:88)

18 D73A-AD6 (SEQ ID No.:90)

19 D70A-AB5 (SEQ ID No.:96); D70A-AB8 (SEQ ID No.:100);  
D70A-BH2 (SEQ ID No.:102); D70A-AA4 (SEQ ID No.:104); D70A-  
BA1 (SEQ ID No.:106); D70A-BA9 (SEQ ID No.:108)

20 D70A-BD4 (SEQ ID No.:110)

21 D181-AC5 (SEQ ID No.:112); D144-AH1 (SEQ ID No.:114);  
D34-65 (SEQ ID No.:116)

22 D35-BG2 (SEQ ID No.:118)

23 D73A-AH7 (SEQ ID No.:120)

24 D58-AA1 (SEQ ID No.:122); D185-BC1 (SEQ ID No.:134);  
D185-BG2 (SEQ ID No.:136)

25 D73-AE10 (SEQ ID No.:124)

26 D56-AC12 (SEQ ID No.:126)

27 D177-BF7 (SEQ ID No.:128); D185-BD2 (SEQ ID No.:140)

28 D73A-AG3 (SEQ ID No.:130)

29 D70A-AA12 (SEQ ID No.:132); D176-BF2 (SEQ ID No.:86)

30 D176-BC3 (SEQ ID No.:146)

31 D176-BB3 (SEQ ID No.:148)

32 D186-AH4 (SEQ ID No.:6)

EXAMPLE 11: RELATED AMINO ACID SEQUENCE IDENTITY OF FULL LENGTH CLONES

The nucleic acid sequence of full length Nicotiana genes cloned in Example 5 were deduced for their entire amino acid sequence. Cytochrome p450 genes were identified by the presence of three conserved p450 domain motifs, which corresponded to UXXRXXZ, PXRFXF or GXRXC at the carboxyl-terminus where U is E or K, X is any amino acid and Z is P, T, S or M. It was also noted that two of the clones appeared nearly complete but lacked the appropriate stop codon, D130-AA1 and D101-BA2, however but both contained all three p450 cytochrome domains. All p450 genes were characterized for amino acid identity using a BLAST program comparing their full length sequences to each other and to known tobacco genes. The program used the NCBI special BLAST tool (Align two sequences (b12seq), <http://www.ncbi.nlm.nih.gov/blast/b12seq/b12.html>). Two sequences were aligned under BLASTN without filter for nucleic acid sequences and BLASTP for amino acid sequences. Based on their percentage amino acid identity, each sequence was grouped into identity groups where the grouping contained members that shared at least 85% identity with another member. A preferred grouping was observed for those sequences with 90% amino acid identity or greater, a more preferred grouping had 95% amino acid identity or greater, and a most preferred grouping had those sequences 99% amino acid identity or greater. Using these criteria, 25 unique groups were identified and are depicted in Table III.

Within the parameters used for Table III for amino acid identity, three groups were found to contain greater than 85% or greater identity to known tobacco genes. Members of Group 5 had up to 96% amino acid identity for full length sequences to prior GenBank sequences of GI:14423327 (or AAK62346) by Ralston et al. Group 23 had up to 93% amino acid identity to GI:14423328 (or AAK62347) by Ralston et al. and Group 24 had 92% identity to GI:14423318 (or AAK62343) by Ralston et al.

Table III: Amino Acid Sequence Identity Groups of Full Length Nicotiana p450 Genes

- 1 D208-AD9 (SEQ. ID. No. 224); D120-AH4 (SEQ. ID. No. 180); D121-AA8 (SEQ. ID. No. 182), D122-AF10 (SEQ. ID. No. 184); D103-AH3 (SEQ. ID. No. 222); D208-AC8 (SEQ. ID. No. 218); D-235-ABI (SEQ. ID. No. 246)
- 2 D244-AD4 (SEQ. ID. No. 250); D244-AB6 (SEQ. ID. No. 274) ; D285-AA8; D285-AB9; D268-AE2 (SEQ. ID. No. 270)
- 3 D100A-AC3 (SEQ. ID. No. 168); D100A-BE2
- 4 D205-BE9 (SEQ. ID. No. 276); D205-BG9 (SEQ. ID. No. 202); D205-AH4 (SEQ. ID. No. 294)
- 5 D259-AB9 (SEQ. ID. No. 260) ; D257-AE4 (SEQ. ID. No. 268); D147-AD3 (SEQ. ID. No. 194)
- 6 D249-AE8 (SEQ. ID. No. 256); D-248-AA6 (SEQ. ID. No. 254)
- 7 D233-AG7 (SEQ. ID. No. 266; D224-BD11 (SEQ. ID. No. 240); DAF10
- 8 D105-AD6 (SEQ. ID. No. 172); D215-AB5 (SEQ. ID. No. 220); D135-AE1 (SEQ. ID. No. 190)

- 9 D87A-AF3 (SEQ. ID. No. 216), D210-BD4 (SEQ. ID. No. 262)
- 10 D89-AB1 (SEQ. ID. No. 150); D89-AD2 (SEQ. ID. No. 152); 163-AG11 (SEQ. ID. No. 198); 163-AF12 (SEQ. ID. No. 196)
- 11 D267-AF10 (SEQ. ID. No. 296); D96-AC2 (SEQ. ID. No. 160); D96-AB6 (SEQ. ID. No. 158); D207-AA5 (SEQ. ID. No. 204); D207-AB4 (SEQ. ID. No. 206); D207-AC4 (SEQ. ID. No. 208)
- 12 D98-AG1 (SEQ. ID. No. 164); D98-AA1 (SEQ. ID. No. 162)
- 13 D209-AA12 (SEQ. ID. No. 212); D209-AA11; D209-AH10 (SEQ. ID. No. 214); D209-AH12 (SEQ. ID. No. 232); D90a-BB3 (SEQ. ID. No. 154)
- 14 D129-AD10 (SEQ. ID. No. 188); D104A-AE8 (SEQ. ID. No. 170)
- 15 D228-AH8 (SEQ. ID. No. 244); D228-AD7 (SEQ. ID. No. 241), D250-AC11 (SEQ. ID. No. 258); D247-AH1 (SEQ. ID. No. 252)
- 16 D128-AB7 (SEQ. ID. No. 186) ; D243-AA2 (SEQ. ID. No. 248); D125-AF11 (SEQ. ID. No. 228)
- 17 D284-AH5 (SEQ. ID. No. 298); D110-AF12 (SEQ. ID. No. 176)
- 18 D221-BB8 (SEQ. ID. No. 234)
- 19 D222-BH4 (SEQ. ID. No. 236)
- 20 D134-AE11 (SEQ. ID. No. 230)
- 21 D109-AH8 (SEQ. ID. No. 174)
- 22 D136-AF4 (SEQ. ID. No. 278)
- 23 D237-AD1 (SEQ. ID. No. 226)
- 24 D112-AA5 (SEQ. ID. No. 178)
- 25 D283-AC1 (SEQ. ID. No. 272)

The full length genes were further grouped based on the highly conserved amino acid homology between UXXRXXZ p450 domain and GXRXC p450 domain near the end the carboxyl-terminus. As shown in Figure 3, individual clones were aligned for their sequence homology between the conserved domains relative to each other and placed in distinct identity groups. In several cases, although the nucleic acid sequence of the clone was unique, the amino acid sequence for the region was identical. The preferred grouping was observed for those sequences with 90% amino acid identity or greater, a more preferred group had 95% amino acid identity or greater, and a most preferred grouping had those sequences 99% amino acid identity or greater. The final grouping was similar to that based on the percent identity for the entire amino acid sequence of the clones except for Group 17 (of Table III) which was divided into two distinct groups.

Within the parameters used for amino acid identity in Table IV, three groups were found to contain 90% or greater identity to known tobacco genes. Members of Group 5 had up to 93.4% amino acid identity for full length sequences to prior GenBank sequences of GI:14423326 (AAK62346) by Ralston et al. Group 23 had up to 91.8% amino acid identity to GI:14423328 (or AAK62347) by Ralston et al. and Group 24 had 98.8% identity to GI:14423318 (or AAK62342) by Ralston et al.

Table IV: Amino Acid Sequence Identity Groups of Regions between Conserved Domains of Nicotiana p450 Genes

- 1 1 D208-AD9 (SEQ. ID. No. 224); D120-AH4 (SEQ. ID. No. 180); D121-AA8 (SEQ. ID. No. 182), D122-AF10 (SEQ. ID. No. 184); D103-AH3 (SEQ. ID. No. 222); D208-AC8 (SEQ. ID. No. 218); D-235-ABI (SEQ. ID. No. 246)
- 2 D244-AD4 (SEQ. ID. No. 250); D244-AB6 (SEQ. ID. No. 274) ; D285-AA8; D285-AB9; D268-AE2 (SEQ. ID. No. 270)
- 3 D100A-AC3 (SEQ. ID. No. 168); D100A-BE2
- 4 D205-BE9 (SEQ. ID. No. 276); D205-BG9 (SEQ. ID. No. 202); D205-AH4 (SEQ. ID. No. 294)
- 5 D259-AB9 (SEQ. ID. No. 260) ; D257-AE4 (SEQ. ID. No. 268); D147-AD3 (SEQ. ID. No. 194)
- 6 D249-AE8 (SEQ. ID. No. 256); D-248-AA6 (SEQ. ID. No. 254)
- 7 D233-AG7 (SEQ. ID. No. 266; D224-BD11 (SEQ. ID. No. 240); DAF10
- 8 D105-AD6 (SEQ. ID. No. 172); D215-AB5 (SEQ. ID. No. 220); D135-AE1 (SEQ. ID. No. 190)
- 9 D87A-AF3 (SEQ. ID. No. 216), D210-BD4 (SEQ. ID. No. 262)
- 10 D89-AB1 (SEQ. ID. No. 150); D89-AD2 (SEQ. ID. No. 152); 163-AG11 (SEQ. ID. No. 198); 163-AF12 (SEQ. ID. No. 196)
- 11 D267-AF10 (SEQ. ID. No. 296); D96-AC2 (SEQ. ID. No. 160); D96-AB6 (SEQ. ID. No. 158); D207-AA5 (SEQ. ID. No. 204); D207-AB4 (SEQ. ID. No. 206); D207-AC4 (SEQ. ID. No. 208)
- 12 D98-AG1 (SEQ. ID. No. 164); D98-AA1 (SEQ. ID. No. 162)
- 13 D209-AA12 (SEQ. ID. No. 212); D209-AA11; D209-AH10 (SEQ. ID. No. 214); D209-AH12 (SEQ. ID. No. 232); D90a-BB3 (SEQ. ID. No. 154)

- 14 D129-AD10 (SEQ. ID. No. 188); D104A-AE8 (SEQ. ID. No. 170)
- 15 D228-AH8 (SEQ. ID. No. 244); D228-AD7 (SEQ. ID. No. 241), D250-AC11 (SEQ. ID. No. 258); D247-AH1 (SEQ. ID. No. 252)
- 16 D128-AB7 (SEQ. ID. No. 186) ; D243-AA2 (SEQ. ID. No. 248); D125-AF11 (SEQ. ID. No. 228)
- 17 D284-AH5 (SEQ. ID. No. 298); D110-AF12 (SEQ. ID. No. 176)
- 18 D221-BB8 (SEQ. ID. No. 234)
- 19 D222-BH4 (SEQ. ID. No. 236)
- 20 D134-AE11 (SEQ. ID. No. 230)
- 21 D109-AH8 (SEQ. ID. No. 174)
- 22 D136-AF4 (SEQ. ID. No. 278)
- 23 D237-AD1 (SEQ. ID. No. 226)
- 24 D112-AA5 (SEQ. ID. No. 178)
- 25 D283-AC1 (SEQ. ID. No. 272)
- 26 D110-AF12 (SEQ. ID. No. 176)

EXAMPLE 12: NICOTIANA CYTOCHROME P450 CLONES LACKING ONE OR MORE OF THE TOBACCO CYTOCHROME P450 SPECIFIC DOMAINS

Four clones had high nucleic acid homology, ranging 90% to 99% nucleic acid homology, to other tobacco cytochrome genes reported in Table III. The four clones included D136-AD5, D138-AD12, D243-AB3 and D250-AC11. However, due to a nucleotide frameshift these genes did not contain one or more of three C-terminus cytochrome p450 domains and were excluded from identity groups presented in Table III or Table IV.

The amino acid identity of one clone, D95-AG1, did not contain the third domain, GXRXC, used to group p450 tobacco genes in Table III or Table IV. The nucleic acid homology of this clone had low homology to other tobacco cytochrome genes. This clone represents a novel and different group of cytochrome p450 genes in Nicotiana.

EXAMPLE 13: USE OF NICOTIANA CYTOCHROME P450 FRAGMENTS AND CLONES IN ALTERED REGULATION OF TOBACCO PROPERTIES

The use of tobacco p450 nucleic acid fragments or whole genes are useful in identifying and selecting those plants that have altered tobacco phenotypes or tobacco constituents and, more importantly, altered metabolites. Transgenic tobacco plants are generated by a variety of transformation systems that incorporate nucleic acid fragments or full length genes, selected from those reported herein, in orientations for either down-regulation, for example anti-sense orientation, or over-expression for example, sense orientation. For over-expression to full length genes, any nucleic acid sequence that encodes the entire or a functional part or amino acid sequence of the full-length genes described in this invention are desired that are effective for increasing the expression of a certain enzyme and thus resulting in phenotypic effect within Nicotiana. Nicotiana lines that are homozygous lines are obtained through a series of backcrossing and assessed for phenotypic changes including, but not limited to, analysis of endogenous p450 RNA, transcripts, p450 expressed peptides and concentrations of plant metabolites using techniques commonly available to one having ordinary skill in the art.

The changes exhibited in the tobacco plants provide information on the functional role of the selected gene of interest or are of a utility as a preferred *Nicotiana* plant species.

Numerous modifications and variations in practice of the invention are expected to occur to those skilled in the art upon consideration of the foregoing detailed description of the invention. Consequently, such modifications and variations are intended to be included within the scope of the following claims.

**WHAT IS CLAIMED IS:**

1. An isolated nucleic acid molecule from *Nicotiana*, wherein said nucleic acid molecule comprises a nucleic acid sequence selected from the group consisting of SEQ. ID. No.: 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295 and 297.
2. An isolated nucleic acid molecule from *Nicotiana* wherein said nucleic acid molecule comprises a nucleic acid sequence selected from the group consisting of SEQ. ID. No. 299 through SEQ. ID. No. 357.
3. An isolated protein from *Nicotiana*, wherein said protein comprises an amino acid sequence selected from the group consisting of SEQ. ID. No.: 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296 and 298.

4. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 180 or SEQ. ID. No. 182, SEQ. ID. No. 184 or SEQ. ID. No. 224.
5. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 218 or SEQ. ID. No. 246.
6. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 168.
7. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 202, 204 or SEQ. ID. No. 276.
8. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 20, SEQ. ID. No. 260, or SEQ. ID. No. 268.
9. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at

least 85% amino acid identity to SEQ. ID. No. 256 and SEQ. ID. No. 254.

10. An isolated protein from *Nicotiana*, wherein said wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 266 or SEQ. ID. No. 240.
11. An isolated protein from *Nicotiana*, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 172, SEQ. ID. No. 190 or SEQ. ID. No. 220.
12. An isolated protein from *Nicotiana*, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 216 or SEQ. ID. No. 262.
13. An isolated protein from *Nicotiana*, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 50, SEQ. ID. No. 152, SEQ. ID. No. 196 or SEQ. ID. No. 198.
14. An isolated protein from *Nicotiana*, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 296, SEQ.

ID. No. 160, SEQ. ID. No. 158, SEQ. ID. No. 204 SEQ.  
ID. No. 206 and SEQ. ID. No. 208.

15. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 162 or SEQ. ID. No. 164.
16. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 212, 214 238 or 254.
17. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 188 or 170.
18. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 214, 241, 258 or 252.
19. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 186, SEQ. ID. No. 248, or SEQ. ID. No. 228.

20. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 298 or SEQ. ID. No. 176.
21. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 234.
22. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 236.
23. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 230.
24. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 174.
25. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 174.

26. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 226.
27. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 178.
28. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 272.
29. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 180 or SEQ. ID. No. 182, SEQ. ID. No. 184 or SEQ. ID. No. 224.
30. An isolated protein from Nicotiana, wherein said protein has at least 90% homology to an amino acid sequence comprising SEQ. ID. No. 218 or SEQ. ID. No. 246.
31. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 168

32. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 202, 204 or SEQ. ID. No. 276.
33. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 20, SEQ. ID. No. 260, or SEQ. ID. No. 268.
34. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 256 and SEQ. ID. No. 254.
35. An isolated protein from Nicotiana, wherein said wherein said protein comprises an amino acid sequence comprising at least 85% amino acid identity to SEQ. ID. No. 266 or SEQ. ID. No. 240.
36. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 172, SEQ. ID. No. 190 or SEQ. ID. No. 220.
37. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at

least 90% amino acid identity to SEQ. ID. No. 216 or SEQ. ID. No. 262.

38. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 50, SEQ. ID. No. 152, SEQ. ID. No. 196 or SEQ. ID. No. 198.
39. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 296, SEQ. ID. No. 160, SEQ. ID. No. 158, SEQ. ID. No. 204 SEQ. ID. No. 206 and SEQ. ID. No. 208.
40. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 162 or SEQ. ID. No. 164.
41. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 212, 214 238 or 254.
42. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at

least 90% amino acid identity to SEQ. ID. No. 188 or 170.

43. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 214, 241, 258 or 252.
44. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 186, SEQ. ID. No. 248, or SEQ. ID. No. 228.
45. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 298 or SEQ. ID. No. 176.
46. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 234.
47. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 236.

48. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 230.
49. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 174.
50. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 174.
51. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 226.
52. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 178.
53. An isolated protein from Nicotiana, wherein said protein comprises an amino acid sequence comprising at least 90% amino acid identity to SEQ. ID. No. 272.

54. A transgenic plant, wherein said transgenic plant comprises the nucleic acid molecule of Claim 1 or 2.
55. The transgenic plant of Claim 54, wherein said plant is a tobacco plant.
56. A method of producing a transgenic plant, wherein said method comprises the steps of:
- (i) operably linking said nucleic acid molecule of any one of the Claims 1 or 2 with a promoter functional in said plant to create a plant transformational vector;
  - (ii) transforming said plant with said plant transformational vector of step;
  - (iii) selecting a plant cell transformed with said transformation vector; and
  - (iv) regenerating a transformation plant from said transformed plant cell.
57. The method of Claim 56, wherein said nucleic acid molecule is in an antisense orientation.
58. The method of Claim 56, wherein said nucleic acid molecule is in a sense orientation.
59. The method of Claim 56, wherein said nucleic acid molecule is in a RNA interference orientation.

60. The method of Claim 56, wherein said nucleic acid molecule is expressed as a double stranded RNA molecule.
61. The method of Claim 56, wherein said double stranded RNA molecule is about 15 to 25 nucleotides in length.
62. The method of Claim 56, wherein said transgenic plant is a tobacco plant.
63. A method of selecting a plant containing a nucleic acid molecule, wherein said plant is analyzed for the presence of nucleic acid sequence selected from the group consisting of 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295 and 297.
64. The method of selecting a plant of Claim 63, wherein said plant is analyzed by DNA hybridization.
65. The method of selecting a plant of Claim 64, wherein said DNA hybridization is Southern blot analysis.

66. The method of selecting a plant of Claim 65, wherein said DNA hybridization is Northern blot analysis.
67. The method of selecting a plant of Claim 66, wherein said plant is analyzed by PCR detection.
68. The method of Claim 67, wherein said plant is a tobacco plant.
69. The method of Claim 85, wherein said DNA hybridization comprises a nucleic acid probe, said nucleic acid probe is a nucleic acid fragment comprising a nucleic acid sequence selected from the group consisting of 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295 and 297.
70. The method of selecting a plant of Claim 69, wherein said plant is a transgenic plant.
71. The method of selecting a plant of Claim 69, wherein said plant is selected from a mutagenesis population.

72. The method of selecting a plant of Claim 69, wherein said plant is selected from a breeding population.
73. The method of selecting a plant of Claim 69, wherein said plant is selected from a Nicotiana.

## FIG. 1

## SEQ ID 1 D58-BG7

1 GCACAAC TT GCTATCAACT TGGTCACATC TATGTTGGGT  
61 CATTGTGTTGC ATCATT TTTAC ATGGGCTCCG GCGGGGGG TTAACCCGGA GGATATTGAC  
121 TTGGAGGAGA GCCCTGGAAC AGTAACTTAC ATGAAAAATC CAATACAAGC TATTCCAAC T  
181 CCAAGATTGC CTGCACACTT GTATGGACGT GTGCCAGTGG ATATGTAA

## SEQ ID 2

AQLAINLVTSMLGHLHFTWAPAPGVNPEDIDLEESPGTVTYMKNPIQAIPTPRLPALHLYGRVPVDM

## FIG. 2

## SEQ ID 3 D58-AB1

1 GCACAAC TT TGCTATCAAC TTGGTCACAT CTATGTTGGG  
61 TCATTTGTTG CATCATTTTA CGTGGGCTCC GCGGGGGG GTTAACCCGGA AGAATATTGA  
121 CTTGGAGGAG AGCCCTGGAA CAGTAACTTA CATGAAAAAT CCAATACAAG CTATTCCTAC  
181 TCCAAGATTG CCTGCACACT TGTATGGACG TGTGCCAGTG GATATGTAA

## SEQ ID 4

AQLAINLVTSMLGHLHFTWAPPPGVNPNIDLEESPGTVTYMKNPIQAIPTPRLPALHLYGRVPVDM

## FIG. 3

## SEQ ID 5 D186-AH4

1 ATGAATTAT TCATTGCAAG TGGAACACCT TTCAATTGCT  
61 CATATGATCC AAGGTTTCAG TTTTGCAACT ACGACCAATG AGCCTTTGGA TATGAAACAA  
121 GGTGTGGGTT TAACTTTACC AAAGAAGACT GATGTTGAAG TGCTAATTAC ACCTCGCCTT  
181 CCTCCTACGC TTTATCAATA TTAA

## SEQ ID 6

MNYSLQVEHLSIAHMIQGFSEFATTTNEPLDMKQGVGLTLPKKT DVEVLITPRLPPTLYQY

## FIG. 4

## SEQ ID 7 D58-BE4

1 GCACAAC TT GCTATCAACT TGGTCACATC TATGTTGGGT  
61 CATTGTGTTCA TCATTTTACA TGGGCTCCG CCGGGGGG TTAACCCGGA GATATTGACT  
121 TGGAGGAGAG CCCTGGAACA GTAACCTTACA TGA

## SEQ ID 8

AQLAINLVTSMLGHLFIILHGLRPRGLTRRILTWRRALEQ

## FIG. 5

## SEQ ID 9 D56-AH7

1 GAAGGATTG GCTGTTTCGAA TGGTTGCCTT GTCATTGGGA  
61 TGTATTATTC AATGTTTTGA TTGGCAACGA ATCGGCGAAG AATTGGTTGA TATGACTGAA  
121 GGAAGTGGAC TTAACCTTACC TAAAGCTCAA CCTTTGGTGG CCAAGTGTAG CCCACGACCT  
181 AAAATGGCTA ATCTTCTCTC TCAGATTGA

## SEQ ID 10

EGLAVRMVALSLGCI IQCFDWQRIGEELVDMTEGTGLTLPKAQPLVAKCSPRPKMANLLSQI

## FIG. 6

## SEQ ID 11 D13a-5

1 GAAGGATTG GCTATTCGAA TGGTTGCATT GTCATTGGGA  
61 TGTATTATTC AATGCTTTGA TTGGCAACGA CTTGGGGAAG GATTGGTTGA TAAGACTGAA  
121 GGAAGTGGAC TTACTTTGCC TAAAGCTCAA CCTTTAGTGG CCAAGTGTAG CCCACGACCT  
181 ATAATGGCTA ATCTTCTTTC TCAGATTGA

SEQ ID 12  
EGLAIRMVALLSLGCI IQCFDWQRLGEGLVDKTEGTGLTLPKAQPLIVAKCSRPIMANLLSQI

## FIG. 7

## SEQ ID 13 D56-AG10

1 ATAGGTTTT GCGACTTTAG TGACACATCT GACTTTTGGT  
61 CGCTTGCTTC AAGGTTTTGA TTTTAGTAAG CCATCAAACA CGCCAATTGA CATGACAGAA  
121 GCGTAGGCG TTACTTTGCC TAAGGTTAAT CAAGTTGAAG TTCTAATTAC CCCTCGTTTA  
181 CCTTCTAAGC TTTATTTATT TTGA

SEQ ID 14  
IGFATLVTHLTFGRLLQGFD FSKPSNTPIDMTEGVGVTL PKVNQVEVLITPRLPSKLYLF

## FIG. 8

## SEQ ID 15 D35-33

1 ATAGGCTTT GCGACTTTAG TGACACATCT GACTTTTGGT  
61 CGCTTGCTTC AAGGTTTTGA TTTTAGTAAG CCATCAAACA CGCCAATTGA CATGACAGAA  
121 GCGTAGGCG TTACTTTGCC TAAGGTTAAT CAAGTTGAAG TTCTAATTAC CCCTCGTTTA  
181 CCTTCTAAGC TTTATTTAT

SEQ ID 16  
IGFATLVTHLTFGRLLQGFD FSKPSNTPIDMTEGVGVTL PKVNQVEVLITPRLPSKLYL

## FIG. 9

## SEQ ID 17 D34-62

1 ATAAATTTT GCGACTTTAG TGACACATCT GACTTTTGGT  
61 CGCTTGCTTC AAGGTTTTGA TTTTAGTACG CCATCAAACA CGCCAATAGA CATGACAGAA  
121 GCGTAGGCG TTACTTTGCC TAAGGTAAAT CAAGTGGAAG TTCTAATTAG CCCTCGTTTA  
181 CCTTCTAAGC TTTATGTATT CTGA

SEQ ID 18  
INFATLVTHLTFGRLLQGFD FSTPSNTPIDMTEGVGVTL PKVNQVEVLISPRLP SKLYVF

## FIG. 10

## SEQ ID 19 D56AA7

1 ATTATACTT GCATTGCCAA TTCTTGGCAT CACTTTGGGA  
61 CGTTTGGTTC AGAAGTTGA GCTGTTGCCT CCTCCAGGCC AGTCGAAGCT CGACACCACA  
121 GAGAAAGGTG GACAGTTCAG TCTCCACATT TTGAAGCATT CCACCATTGT GTTGAAACCA  
181 AGGTCTTTCT GA

SEQ ID 20  
IILALPILGITLGRVLQNFELLPPPGQSKLDTTEKGGQFSLHILKHSTIVLKPRSF

## FIG. 11

## SEQ ID 21 D56-AE1

1 ATTATACTT GCATTGCCAA TTCTTGGCAT TACTTTGGGA  
61 CGTTTGGTTC AGAACTTTGA GCTGTTGCCT CCTCCAGGCC AGTCGAAGCT CGACACCACA  
121 GAGAAAGGTG GACAGTTCAG TCTCCATATT TTGAAGCATT CCACCATTGT GTTGAAACCA  
181 AGGTCTTGCT GA

## SEQ ID 22

IILALPILGITLGRILVQNPELLPPPGQSKLDTTEKGGQFSLHILKHSTIVLKPRSC

## FIG. 12

## SEQ ID 23 D35-BB7

1 TATTGCACTT GGGGTTGCAT CAATGGAAC TGCATTGTCA  
61 AATCTTCTTT ATGCATTTGA TTGGGAGTTA CCTTTTGGAA TGAAAAAAGA AGACATTGAC  
121 ACAAACGCCA GGCCTGGAAT TACCATGCAT AAGAAAAACG AACTTTATCT TATCCCTAAA  
181 AATTATCTAT AG

## SEQ ID 24

IALGVASMELALSNLLYAFDWELPFGMKKEDIDTNARPGITMHKKNELYLIPKNYLPSKLYLF

## FIG. 13

## SEQ ID 25 D177-BA7

1 ATTGCACTTG GGGTTCATC CATGGAACCT  
121 GCTTTGTCAA ATCTTCTTTA TGCATTTGAT TGGGAGTTAC CTTACGGAGT GAAAAAAGAA  
181 AACATTGACA CAAATGTCAG GCCTGGAATT ACCATGCATA AGAAAAACGA ACTTTGCCTT  
241 ATCCCTAGAA ATTATCTATA G

## SEQ ID 26

IALGVASMELALSNLLYAFDWELPYGVKKENIDTNVRPGITMHKKNELCLIPRNYL

## FIG. 14

## SEQ ID 27 D56A-AB6

1 GGTATTGCAC TTGGGGTTGC ATCCATGGAA CTGCTTTGT CAAATCTTCT TTATGCATTT  
61 GATTGGGAGT TGCCTTATGG AGTGAAAAA GAAGACATCG ACACAAACGT TAGGCCTGGA  
121 ATTGCCATGC ACAAGAAAAA CGAACTTTGC CTTGTCCCAA AAAATTATTT ATAA

## SEQ ID 28

IALGVASMELALSNLLYAFDWELPYGVKKEDIDTNVRPGIAMHKKNELCLVPKNYL

## FIG. 15

## SEQ ID 29 D144-AE2

1 ATT GCACTTGGGG TTGCATCCAT GGAACCTTGCT  
61 TTGTCAAATC TTCTTTATGC ATTTGATTGG GAGTTGCCTT ATGGAGTGAA AAAAGAAGAC  
121 ATCGACACAA ACGTTAGGCC TGGAATTGCC ATGCACAAGA AAAACGAACT TTGCCTTGTC  
181 CCAAAAAAAT TATTTATAAA TTATATTGGG ACGTGGATCT CATGCTAG

## SEQ ID 30

IALGVASMELALSNLLYAFDWELPYGVKKEDIDTNVRPGIAMHKKNELCLVPKKLFINYIGTWISC

FIG. 16

SEQ ID 31                    D56-AG11  
 1 AT TTCGTTT GGT TAGCTA ATGCTTATTT GCCATTGGCT  
 61 CAATTACTTT ATCACTTTGA TTGGGAACTC CCCACTGGAA TCAAACCAAG CGACTTGGAC  
 121 TTGACTGAGT TGGTTGGAGT AACTGCCGCT AGAAAAAGTG ACCTTTACTT GGTGCGACT  
 181 CCTTATCAAC CTCCTCAAAA CTGA  
 SEQ ID 32  
 ISFGLANAYLPLAQLLYHFDWELPTGIKPSDLDTLTVGVTAARKSDLYLVATPYQPPQN

FIG. 17

SEQ ID 33                    D179-AA1  
 1 AT TTCGTTT GGCTTAGCTA ATGCTTATTT GCCATTGGCT  
 61 CAATTACTAT ATCACTTCGA TTGGGAACTC CCTGCTGGAA TCGAACCAAG CGACTTGGAC  
 121 TTGACTGAGT TGGTTGGAGT AACTGCCGCT AGAAAAAGTG ACCTTTACTT GGTGCGACT  
 181 CCTTATCAAC CTCCTCAAAA GTGA  
 SEQ ID 34  
 ISFGLANAYLPLAQLLYHFDWKLPAGIEPSDLDTLTVGVTAARKSDLYLVATPYQPPQK

FIG. 18

SEQ ID 35                    D56-AC7  
 1 ATGCTATTT GGT TAGCTA ATGTTGGACA ACCTTTAGCT  
 61 CAGTTACTTT ATCACTTCGA TTGGGAACTC CCTAATGGAC AAAGTCATGA GAATTCGAC  
 121 ATGACTGAGT CACCTGGAAT TTCTGCTACA AGAAGGATG ATCTTGTTTT GATTGCCACT  
 181 CCTTATGATT CTTATTAAATTCCAGTCTA TATCATCTAT ATGTACTCAA TAATTGTATG  
 361 GGA  
 SEQ ID 36  
 MLFGLANVGQPLAQLLYHFDWKLPNGQSHENFDMTESPGISATRKDDLVLIIATPYDSY

FIG. 19

SEQ ID 37                    D144-AD1  
 1 ATGC TATTTGGTTT AGCTAATGTT  
 61 GGACAACCTT TAGCTCAGTT ACTTTATCAC TTCGATTGGA AACTCCCTAA TGGACAACT  
 121 CACCAAAATT TCGACATGAC TGAGTCACCT GGAATTTCTG CTACAAGAAA GGATGATCTT  
 181 ATTTTGATTG CCACTCCTGC TCATTCTTGA  
 SEQ ID 38  
 MLFGLANVGQPLAQLLYHFDWKLPNGQTHQNFDMTESPGISATRKDDLIIATPAHS

FIG. 20

SEQ ID 39                    D144-AB5  
 1 TTAT TATTCGGTTT AGTTAATGTA  
 61 GGACATCCTT TAGCTCAATT GCTTTATCAC TTCGATTGGA AGACTCTTCC TGGGATAAGT  
 121 TCAGATAGTT TCGACATGAC TGAAACAGAT GGAGTAACTG CCGGAAGAAA GGATGATCTT  
 181 TGTTTAATTG CTACTCCTTT TGGTCTCAAT TAA  
 SEQ ID 40  
 LLFGLVNVGHPLAQLLYHFDWKTLPGISSDSFDMTETDGVTAGRKDDLIIATPFGLN

## FIG. 21

## SEQ ID 41 D181-AB5

1 A TGTCGTTTGG TTTAGTTAAC ACTGGGCATC CTTTAGCTCA  
61 GTTGCTCTAT TTCTTTGACT GGAAATTCCC TCATAAGGTT AATGCAGCTG ATTTTCACAC  
121 TACTGAAACA AGTAGAGTTT TTGCAGCAAG CAAAGATGAC CTCTACTTGA TTCCAACAAA  
181 TCACATGGAG CAAGAGTAG

## SEQ ID 42

MSFGLVNTGHPLAQLLYFFDWKFPHKVNAADFHTTETS RVFAASKDDLYLIPTNHMEQE

## FIG. 22

## SEQ ID 43 D73-AC9

1 AT GTCGTTTGGT TTAGTTAACA CAGGGCATCC TTTAGCCCAG  
121 TTGCTCTATT GCTTTGACTG GAAACTCCCT GACAAGGTTA ATGCAAATGA TTTTCGCACT  
181 ACTGAAACAA GTAGAGTTTT TGCAGCAAGC AAAGATGACC TCTACTTGAT TCCCACAAAT  
241 CACAGGGAGC AAGAATAG

## SEQ ID 44

MSFGLVNTGHPLAQLLYCFDWKLDPKVNANDFRTTETS RVFAASKDDLYLIPTNHREQE

## FIG. 23

## SEQ ID 45 D56-AC12

1 ATGCAATTT GGTTTGGCTC TTGTTACTCT GCCATTGGCT  
61 CATTTGCTTC ACAATTTTGA TTGGAAACTT CCCGAAGGAA TTAATGCAAG GGATTGGAC  
121 ATGACAGAGG CAAATGGGAT ATCTGCTAGA AGAGAAAAAG ATCTTTACTT GATTGCTACT  
181 CCTTATGTAT CACCTCTTGA TTAA

## SEQ ID 46

MQFGLALVTLPLAHLHLNFDWKLPEGINARDLDMTEANGISARREKDYLIATPYVSPLD

## FIG. 24

## SEQ ID 47 D58-AB9

1 ATGACTTAT GCATTGCAAG TGGAACACCT AACAATGGCA  
61 CATTTGATCC AGGGTTTCAA TTACAGAACT CCAACTGATG AGCCCTTGGA TATGAAAGAA  
121 GGTGCAGGCA TAACTATACG TAAGGTAAAT CCTGTGAAAG TGATAATTAC GCCTCGCTTG  
181 GCACCTGAGC TTTATTAA

## SEQ ID 48

MTYALQVEHLTMAHLIQGFNYRTPDEPLDMKEGAGITIRKVNPFVKVIITPRLAPELY

## FIG. 25

## SEQ ID 49 D56-AG9

1 ATGACTTAT GCATTGCAAG TGGAACACCT AACAATGGCA  
61 CATTTAATCC AGGGTTTCAA TTACAAAACCT CCAAATGACG AGGCCTTGGA TATGAAGGAA  
121 GGTGCAGGCA TAACTATACG TAAGGTAAAT CCTGTGGAAC TGATAATAGC GCCTCGCCTG  
181 GCACCTGAGC TTTATTAA

## SEQ ID 50

MTYALQVEHLTMAHLIQGFNYKTPNDEALDMKEGAGITIRKVNPFVELIIPRLAPELY

## FIG. 26

SEQ ID 51                    D56-AG6  
1 ATGACTTAT GCATTGCAAG TGGAACACCT AACAATGGCA  
61 CATTTAATCC AGGGTTTCAA TTACAAAACCT CCAAATGACG AGGCCTTGGA TATGAAGGAA  
121 GGTGCAGGCA TAACAATACG TAAGGTAAAT CCAGTGGAAT TGATAATAAC GCCTCGCTTG  
181 GCACCTGAGC TTTACTAA

SEQ ID 52  
MTYALQVEHLTMAHLIQGFNYKTPNDEALDMKEGAGITIRKVNPFVELIITPRLAPELY

## FIG. 27

SEQ ID 53                    D35-BG11  
1 ATGACTTAT GCATTGCAAG TGGAACACTT AACAATGGCA  
61 CATTTGATCC AAGGTTTCAA TTACAGAACT CCAAATGACG AGCCCTTGGA TATGAAGGAA  
121 GGTGCAGGCA TAACTATACG TAAGGTAAAT CCTGTGGAAC TGATAATAGC GCCTCGCCTG  
181 GCACCTGAGC TTTATTAA

SEQ ID 54  
MTYALQVEHLTMAHLIQGFNYRTPNDEPLDMKEGAGITIRKVNPFVELIIPRLAPELY

## FIG. 28

SEQ ID 55                    D35-42  
1 ATGACTTAT GCATTGCAAG TGGAACACTT AACAATGGCA  
61 CATTTGATCC AAGGTTTCAA TTACAGAACT CCAAATGACG AGCCCTTGGA TATGAAGGAA  
121 GGTGCAGGCA TAACTATACG TAAGGTAAAT CCTGTGGAAC TGATAATAGC GCCCCTGGCA  
181 CCTGAGCTTT ATTAA

SEQ ID 56  
MTYALQVEHLTMAHLIQGFNYRTPNDEPLDMKEGAGITIRKVNPFVELIIPRLAPELY

## FIG. 29

SEQ ID 57                    D35-BA3  
1 ATGACTTAT GCATTGCAAG TGGAACACTT AACAATGGCA  
61 CATTTGATCC AAGGTTTCAA TTACAGAACT CCAAATGACG AGCCCTTGGA TATGAAGGAA  
121 GGTGCAGGCA TAACTATACG TAAGGTAAAT CCTGCGGAAC TGATAATAGC GCCTCGCCTG  
181 GCACCTGAGC TTTATTAA

SEQ ID 58  
MTYALQVEHLTMAHLIQGFNYRTPNDEPLDMKEGAGITIRKVNPAELIIPRLAPELY

## FIG. 30

SEQ ID 59                    D34-57  
1 ATGACTTAT GCATTACAAG TGGAACACCT AACAATAGCA  
61 CATTTGATCC AGGGTTTCAA TTACAAAACCT CCAAATGACG AGCCCTTGGA TATGAAGGAA  
121 GGTGCAGGAT TAACCATACG TAAAGTAAAT CCTGTAGAAG TGACAACACTAC GGCTCGCCTG  
181 GCACCTGAGC TTTATTAA

SEQ ID 60  
MTYALQVEHLTIAHLIQGFNYKTPNDEPLDMKEGAGLTIRKVNPFVETTTARLAPLEY

## FIG. 31

SEQ ID 61                    D34-52  
1 ATGACTTAT GCATTACAAG TGGAACACCT AACAAATAGCA  
61 CATTTGATCC AGGGTTTCAA TTACAAAACCT CCAAATGACG AGCCCTTGGA TATGAAGGAA  
121 GGTGCAGGAT TAACTATACG TAAAGTAAAT CCTGTAGAAG TGACAATTAC GGCTCGCCTG  
181 GCACCTGAGC TTTATTAA  
SEQ ID 62  
MTYALQVEHLTIAHLIQGFNYKTPNDEPLDMKEGAGLTIRKVPVEVTITARLAPELY

## FIG. 32

SEQ ID 63                    D34-25  
1 ATGACTTAT GCATTACAAG TGGAACACCT AACAAATAGCA  
61 CATTTGATCC AGGGTTTCAA TTACAAAACCT CCAAATGACG AGCCCTTGGA TATGAAGGAA  
121 GGTGCAGGAT TAACTATACG TAAAGTAAAT CCTGTAGAAG TGACAATTAC GGCTCGCCTG  
181 GCACCTGAGC TTTATTAA  
SEQ ID 64  
MTYALQVEHLTIAHLIQGFNYKTPNDEPLDMKEGAGLTIRKVPVEVTITARLAPELY

## FIG. 33

SEQ ID 65                    D56AD10  
1 TATAGCCTT GGACTIONAGG TTATCCGAGT AACATTAGCC  
61 AACATGTTGC ATGGATTCAA CTGGAAATTA CCTGAAGGTA TGAAGCCAGA AGATATAAGT  
121 GTGGAAGAAC ATTATGGGCT CACTACACAT CCTAAGTTTC CTGTTCCTGT GATCTTGGAA  
181 TCTAGACTTT CTTGAGATCT CTATTCCTCC ATCACTTAA  
SEQ ID 66  
YSLGLKVIRVTLANMLHGFNWKLPEGMKPEDISVEEHYGLTTHPKFPVPVILESRLSSDLYSPIT

## FIG. 34

SEQ ID 67                    D56-AA11  
1 ATACAGTCTT GGGATTGCTA TAATTAGGGC AACTTTAGCT  
61 AACTTGTTGC ATGGATTCAA CTGGAGATTG CCTAATGGTA TGAGTCCAGA AGACATTAGC  
121 ATGGAAGAGA TTTATGGGCT AATTACACAC CCCAAAGTCG CACTTGACGT GATGATGGAG  
181 CCTCGACTTC CCAACCATCT TTACAAATAG  
SEQ ID 68  
YSLGIRIIRATLANLLHGFNWRLPNGMSPEDISMEEIYGLITHPKVALDVMMEPRLPNHLYK

## FIG. 35

SEQ ID 69                    D177-BD5  
1 ATTAATTTTT CAATACCACT TGTTGAGCTT  
121 GCACTTGCTA ATCTATTGTT TCATTATAAT TGGTCACTTC CTGAAGGGAT GCTAGCTAAG  
181 GATGTTGATA TGGAAGAAGC TTTGGGGATT ACCATGCACA AGAAATCTCC CCTTTGCTTA  
241 GTAGCTTCTC ATTATACTTG TTGA  
SEQ ID 70  
INFSIPLVELALANLLFHYNWSLPEGMLAKDVDMEELGITMHKKSPLCLVASHYTC

## FIG. 36

## SEQ ID 71 D56A-AG10

1 ATGCAACTTG GGCTTTATGC ATTGGAAATG GCTGTGGCCC ATCTTCTTCA TTGTTTACT  
61 TGGGAATTGC CAGATGGTAT GAAACCAAGT GAGCTTAAAA TGGATGATAT TTTTGGACTC  
121 ACTGCTCCAA AAGCTAATCG ACTCGTGGCT GTGCCTACTC CACGTTTGTT GTGTCCCCTT  
181 TATTAATTGA

## SEQ ID 72

MLGLYALEMAVAHLLHCFTWELPDGMKPSELKMDDIFGLTAPKANRLVAVPTPRLLCPLY

## FIG. 37

## SEQ ID 73 58-BC5

1 ATGCAACTT GGGCTTTATG CATTAGAAAT GGCAGTGGCC  
61 CATCTTCTTC TTTGCTTTAC TTGGGAATTG CCAGATGGTA TGAAACCAAG TGAGCTTAAA  
121 ATGGATGATA TTTTGGACT CACTGCTCCA AGAGCTAATC GACTCGTGGC TGTGCCTAGT  
181 CCACGTTTGT TGTGCCCACT TTATTAA

## SEQ ID 74

MLGLYALEMAVAHLLLCFTWELPDGMKPSELKMDDIFGLTAPRANRLVAVPSRLLCPLY

## FIG. 38

## SEQ ID 75 D58-AD12

1 ATGCAACTT GGGCTTTATG CATTGGAAAT GGCTGTGGCC  
61 CATCTTCTTC ATTGTTTTAC TTGGGAATTG CCAGATGGTA TGAAACCAAG TGAGCTTAAA  
121 ATGGATGATA TTTTGGACT CACTGCTCCA AGAGCTAATC GACTCGTGGC TGTGCCTACT  
181 CCACGTTTGT TGTGTCCCCT TTATTAA

## SEQ ID 76

MLGLYALEMAVAHLLHCFTWELPDGMKPSELKMDDIFGLTAPRANRLVAVPTPRLLCPLY

## FIG. 39

## SEQ ID 77 D56-AC11

1 ATGCTTTGG AGTGCGAGTA TAGTGCGCGT CAGCTACCTA  
61 ACTTGATTTT ATAGATTCCA AGTATATGCT GGGTCTGTGT TCAGAGTAGC ATGA

## SEQ ID 78

MLWSASIVRVSYLTICIYRFQVYAGSVFVA

## FIG. 40

## SEQ ID 79 D35-39

1 ATGCTTTGG AGTGCGAGTA TAGTGCGCGT CAGCTACCTA  
61 ACTTGATTTT ATAGATTCCA AGTATATGCT GGGTCTGTGT TCAGAGTAGC ATGA

## SEQ ID 80

MLWSASIVRVSYLTICIYRFQVYAGSVFVA

## FIG. 41

SEQ ID 81 D58-BH4

1 ATGCTTTGG AGTGCGAGTA TAGTGCGCGT CAGCTACCTA  
61 ACCTGTATTT ATAGATTCCA AGTATATGCT GGGTCTGTGT TCAGAGTAGC ATGA

SEQ ID 82

MLWSASIVRVSYLTCIYRFQVYAGSVFRVA

## FIG. 42

SEQ ID 83 D177-BD7

1 ATTAATTTTT CAATACCACT TGTTGAGCTT GCACTTGCTA ATCTATTGTT TCATTATAAT  
61 TGGTCACTTC CTGAGGGGAT GCTACCTAAG GATGTTGATA TGGAAGAAGC TTTGGGGATT  
121 ACCATGCACA AGAAATCTCC CCTTTGCTTA GTAGCTTCTC ATTATAACTT GTTGTGA

SEQ ID 84

INFSIPLVELALANLLFHYNWSLPEGMLPKDVDMEELGITMHKKSPLCLVASHYNLL

## FIG. 43

SEQ ID 85

D176-BF2

1 AT ATCATTTGGT TTGGCTAATG TTTATTTGCC ACTAGCTCAA  
121 TTGTTATATC ATTTTGATTG GAAACTCCCT ACTGGAATCA ATTCAAGTGA CTTGGACATG  
181 ACTGAGTCGT CAGGAGTAAC TTGTGCTAGA AAGAGTGATT TATACTTGAC TGCTACTCCA  
241 TATCAACTTT CTCAAGAGTG A

SEQ ID 86

GISFGLANVYLPLAQLLYHFDWKLP TGINSSDLDMTESSGVTCARKSDLYLTATPYQLSQE

## FIG. 44

SEQ ID 87 D56-AD6

1 ATGCTTTGG AGTGCGAGTA TAGTGCGCGT CAGCTACCTA  
61 ACTTGTATTT ATAGATTCCA AGTATATGCT GGGTCTGTGT CCAGAGTAGC ATGA

SEQ ID 88

MLWSASIVRVSYLTCIYRFQVYAGSVSRVA

## FIG. 45

SEQ ID 89 D73A-AD6

1 CT GAATTTTGCA ATGTTAGAGG CAAAATGGC ACTTGCATTG  
121 ATTCTACAAC ACTATGCTTT TGAGCTCTCT CCATCTTATG CACATGCTCC TCATACAATT  
181 ATCACTCTGC AACCTCAACA TGGTGCTCCT TTGATTTTGC GCAAGCTGTA G

SEQ ID 90

LNFAMLEAKMALALILQHYAFELSPSYAHAPHTIITLQPQHGAPLILRKL

FIG. 46

## SEQ ID 91 D70A-BA11

1 CT GAATTTTGGCA ATGTTAGAGG CAAAATGGC ACTTGCAATG  
121 ATTCTACAAC ACTATGCTTT TGAGCTCTCT CCATCTTATG CACACGCTCC TCATACAATT  
181 ATCACTCTGC AACCTCAACA TGGTGCTCCT TTGATTTTGC GCAAGCTGTA G

## SEQ ID 92

LNFAMLEAKMALALILQHYAFELSPSYAHAPHTIITLQPQHGAPLILRKL

FIG. 47

## SEQ ID 93 D70A-BB5

1 AA TAATTTTGGCA ATGTTGGAAA CTAAGATTGC CTTAGCAATG  
121 ATCCTACAGC GTTTGTCTTT CGAGCTTTCT CCATCTTACG CTCATGCACC TACTTATGTC  
181 GTCACCTCTTC GACCTCAGTG TGGTGCTCAC TTAATCTTGC AAAAATTATA GGTCCTTAAT  
241 CTGGATTTCC CATTATTGAG TAGTGCCTAA TAAATCTTCT CTATCACTAT TTTTCCATCT  
301 TTCA

## SEQ ID 94

NNFAMLETKIALAMILQRFELSPSYAHAPTYVVTLRPQCGAHLILQKL

FIG. 48

## SEQ ID 95 D70A-AB5

1 AGCGAAGGGG TGGCAAAGGC AACAAAGGGG AAAATGACAT ATTTTCCATT TGGTGCAGGA  
61 CCGCGAAAAT GCATTGGGGCA AAACCTCGCG ATTTTGGAAG CAAAATGGC TATAGCTATG  
121 ATTCTACAAC GCTTCTCCTT CGAGCTCTCC CCATCTTATA CACACTCTCC ATACACTGTG  
181 GTCACCTTGA AACCCAAATA TGGTGCTCCC CTAATAATGC ACAGGCTGTA GTCCTGTGAG  
241 AATATGCTAT CCGAGGAATT CAGTTCCT

## SEQ ID 96

QNFAILEAKMAIAMILQRFSFELSPSYTHSPYTVVTLKPKYGAPLIMHRL

FIG. 49

## SEQ ID 97 D70A-AA8

1 AGCGAAGGGG TGGCAAAGGC AACAAAGGGG AAAATGACAT ATTTTCCATT TGGTGCAGGA  
61 CCGCGAAAAT GCATTGGGGCA AAACCTCGCG ATTTTGGAAG CAAAATGGC TATAGCTATG  
121 ATTCTACAAC GCTTCTCCTT CGAGCTCTCT CCATCTTATA CACACTCTCC ATACACTGTG  
181 GTCACCTTGA AACCCAAATA TGGTGCTCCC CTAATAATGC ACAGGCTGTA GTCCTGT

## SEQ ID 98

QNFAILEAKMAIAMILQRFSFELSPSYTHSPYTVVTLKPKYGAPLIMHRL

FIG. 50

## SEQ ID 99 D70A-AB8

1 C AAAATTTTGC CATGTTAGAA GCAAAGATGG CTCTGTCTAT GATCCTGCAA  
121 CGCTTCTCTT TTGAAGTGC TCCGTCTTAT GCACATGCC CTCAGTCCAT ATTAACCGT  
181 CAGCCACAAT ATGGTGCTCC ACTTATTTTC CACAAGCTAT AA

## SEQ ID 100

QNFAMLEAKMALSMILQRFSFELSPSYAHAPQSILTVQPQYGAPLIFHKL

## FIG. 51

## SEQ ID 101            D70A-BH2

1 AT AAACCTTTGCA ATGACAGAAG CGAAGATGGC TATGGCTATG  
121 ATTCTGCAAC GCTTCTCCTT TGAGCTATCT CCATCTTACA CACATGCTCC ACAGTCTGTA  
181 ATAACATATGC AACCCCAATA TGGTGCTCCT CTTATATTGC ACAAATTGTA A

## SEQ ID 102

INFAMTEAKMAMAMILQRFSEFELSPSYTHAPQSVITMQPQYGAPLILHKL

## FIG. 52

## SEQ ID 103            D70A-AA4

1 AT AAACCTTTGCA ATGGCAGAAG CGAAGATGGC TATGGCTATG  
121 ATTCTGCAAC GCTTCTCCTT TGAGCTATCT CCATCTTACA CACATGCTCC ACAGTCTGTA  
181 ATAACATATGC AACCCCAATA TGGTGCTCCT CTTATATTGC ACAAATTGTA A

## SEQ ID 104

INFAMAEAKMAMAMILQRFSEFELSPSYTHAPQSVITMQPQYGAPLILHKL

## FIG. 53

## SEQ ID 105            D70A-BA1

1 CA AAACCTTTGCA ATGATGGAAG CAAAATGGC AGTAGCTATG  
121 ATACTACAAA AATTTTCCTT TGAACATCC CTTCTTATA CACATGCTCC ATTTGCAATT  
181 GTGACTATTC ATCCTCAGTA TGGTGCTCCT CTGCTTATGC GCAGACTTTA A

## SEQ ID 106

QNFAMMEAKMAVAMILQKFSFELSPSYTHAPFAIVTIHPQYGAPLLMRRL

## FIG. 54

## SEQ ID 107            D70A-BA9

1 CA AAACCTTTGCA ATGATGGAAG CAAAATGGC AGTAGCTATG  
121 ATACTACATA AATTTTCCTT TGAACATCC CTTCTTATA CACATGCTCC ATTTGCAATT  
181 GTGACTATTC ATCCTCAGTA TGGTGCTCCT CTGCTTATGC GCAGACTTTA A

## SEQ ID 108

QNFAMMEAKMAVAMILHKFSFELPSYTHAPFAIVTIHPQYGAPLLMRRL

## FIG. 55

## SEQ ID 109            D70A-BD4

1 CA AAATTTTGCT ATGTTAGAGG CTAAAATGGC AATGGCTATG  
121 ATTCTGAAAA CCTATGCATT TGAACCTCTCT CCATCTTATG CTCATGCTCC TCATCCACTA  
181 CTAATTCAAC CTCAATATGG TGCTCAATTA ATTTTGTACA AGTTGTAG

## SEQ ID 110

QNFAMLEAKMAMAMILKTYAFELSPSYAHAPHPLLLQPQYGAQLILYKL

## FIG. 56

SEQ ID 111            D181-AC5  
1 TATAGCATGG GGCTCAAGGC GATTCAAGCT AGCTTAGCTA  
61 ATCTTCTACA TGGATTTAAC TGGTCATTGC CTGATAATAT GACTCCTGAG GACCTCAACA  
121 TGGATGAGAT TTTTGGGCTC TCTACACCTA AAAAATTTCC ACTTGCTACT GTGATTGAGC  
181 CAAGACTTTC ACCAAAACCTT TACTCTGTTT GA  
SEQ ID 112  
YSMGLKAIQASLANLLHGFNWSLPDNMTPEDLNMDEIFGLSTPKKFPLATVIEPRLSPKLYSV

## FIG. 57

SEQ ID 113            D144-AH1  
1 TAT AGCTTGGGGC TCAAGGAGAT TCAAGCTAGC  
61 TTAGCTAATC TTCTACATGG ATTTAACTGG TCATTGCCTG ATAATATGAC TCCTGAGGAC  
121 CTCAACATGG ATGAGATTTT TGGGCTCTCT ACACCTAAAA AATTTCCACT TGCTACTGTG  
181 ATTGAGCCAA GACTTTCACC AAAACTTTAC TCTGTTTGA  
SEQ ID 114  
YSLGLKEIQASLANLLHGFNWSLPDNMTPEDLNMDEIFGLSTPKKFPLATVIEPRLSPKLYSV

## FIG. 58

SEQ ID 115            D34-65  
1 CATAGCTTG GGGCTCAAGG TGATTCAAGC TAGCTTAGCT  
61 AATCTTCTAC ATGGATTTAA CTGGTCATTG CCTGATAATA TGACTCCTGA GGACCTCAAC  
121 ATGGATGAGA TTTTGGGCT CTCTACACCT AAAAAATTC CACTTGCTAC TGTGATTGAG  
181 CCAAGACTTT CACCAAACCT TTACTCTGTT TGA  
SEQ ID 116  
HSLGLKVIQASLANLLHGFNWSLPDNMTPEDLNMDEIFGLSTPKKFPLATVIEPRLSPKLYSV

## FIG. 59

SEQ ID 117            D35-BG2  
1 CTGTGCTTT CCATGTTTAA TCTCTAGTTA TATACTGGCT  
61 TTGAATGTGA ATCTGTATCA TAATTTCTTG CAAATTTCTC CTTCCATTTC TTATTAA  
SEQ ID 118  
LCFPCLISSYILALNVNLYHNFLQISPSISY

## FIG. 60

SEQ ID 119            D73A-AH7  
1 TCTG GACTTGCTCA ATGTGTGGTT GTTTAGCTT TAGCAACTCT AGTGCAGTGT  
121 TTTGAGTGGA AAAGGGTAAG CGAAGAGGTG GTTGATTGGA CGGAAGGAAA AGGTCTCACT  
181 ATGCCAAAAC CCGAGCCACT CATGGCTAGG TGCGAAGCTC GTGACATTTT TCACAAAGTT  
241 CTTTCAGAAA TATCTTAA  
SEQ ID 120  
SGLAQCQVVGALATLVQCFEWKRVSEEVVDLTEGKGLTMPKPEPLMARCEARDIFHKVLSEIS

## FIG. 61

## SEQ ID 121 D58-AA1

1 TTGGGCTTG GCAACGGTGC ATGTGAATTT GATGTTGGCC  
61 CGAATGATTC AAGAATTTGA ATGGTCCGCT TACCCGGAAA ATAGGAAAGT GGATTTTACT  
121 GAGAAATTGG AATTTACTGT GGTGATGAAA AATCCTTTAA GAGCTAAGGT CAAGCCAAGA  
181 ATGCAAGTGG TGTAA

## SEQ ID 122

LGLATVHVNLMLARMIQEFWSAYPENRKVDFTEKLEFTVVMKNPLRAKVKPRMQVV

## FIG. 62

## SEQ ID 123 D73A-AE10

1 TATGCTT TGGCTATGCT TCATTTAGAG  
121 TACTTTGTGG CTAATTTGGT TTGGCATTTC CGATGGGAGG CTGTGGAGGG AGATGATGTT  
181 GATCTTTTACG AAAAGCTAGA ATTCACCGTT GTGATGAAGA ATCCACTTCG AGCTCGTATC  
241 TGCCCCAGAG TTAACCTCTAT TTGA

## SEQ ID 124

YALAMHLLEYFVANLVWHFRWEAVEGDDVDLSEKLEFTVVMKNPLRARICPRVNSI

## FIG. 63

## SEQ ID 125 D56A-AC12

1 GGTCAGCAAG TTGGACTTCT TAGAACAACC ATTTTCATCG CCTCATTACT GTCTGAATAT  
61 AAGCTGAAAC CTCGCTCACA CCAGAAACAA GTTGAACTCA CCGATTTAAA TCCAGCAAGT  
121 TGGCTTCATT CGATAAAAGG CGAACTGTTA GTCGATGCGA TTCCTCGAAA GAAGGCGGCA  
181 TTTTAA

## SEQ ID 126

GQQVGLLRTTIFIASLLSEYKLPKPRSHQKQVELTDLNPASWLHSIKGELLVDAIPRKKAFF

## FIG. 64

## SEQ ID 127 D177-BF7

1 ATCACATTTG CTAAGTTTGT GAATGAGCTA  
121 GCATTGGCAA GATTAATGTT CCATTTTGAT TTCTCGCTAC CAAAAGGAGT TAAGCATGAG  
181 GATTTGGACG TGGAGGAAGC TGCTGGAATT ACTGTTAGAA GGAAGTTCCC CCTTTTAGCC  
241 GTCGCCACTC CATGCTCGTG A

## SEQ ID 128

ITFAKRVNELALARLMFHFDLSLPKGVKHEDLDVEEAAGITVRRKFPLLAVATPCS

## FIG. 65

## SEQ ID 129 D73A-AG3

1 CA GAGGTATGCT ATAAACCATT TGATGCTCTT TATTGCGTTG  
121 TTCACGGCTC TGATTGATTT CAAGAGGCAC AAAACGGACG GCTGTGATGA TATCGCGTAT  
181 ATTCCAACCA TTGCTCCAAA GGATGATTGT AAAGTGTTC TTTACAGAG GTGCACTCGA  
241 TTCCCATCTT TTTCATGA

## SEQ ID 130

QRYAINHMLFIALFTALIDFKRHKTGCDIAYIPTIAPKDDCKVFLSQRCTRFPSFS

## FIG. 66

SEQ ID 131            D70A-AA12  
1 ATG TCATTTGGTT TAGCTAATCT TTA CTTACCA TTGGCTCAAT  
121 TACTCTATCA CTTTGACTGG AACTCCCAA CCGGAATCAA GCCAAGAGAC TTGGACTTGA  
181 CCGAATTATC GGAATAACT ATTGCTAGAA AGGGTGACCT TTA CTTAAAT GCTACTCCTT  
241 ATCAACCTTC TCGAGAGTAA  
SEQ ID 132  
MSFGLANLYLPLAQLLYHFDWKLPTGIKPRDLDLTELSGITIARKGDLYLNATPYQPSRE

## FIG. 67

SEQ ID 133            D185-BC1  
1 TTGGGCTTG GCAACGGTGC ATGTGAATTT GATGTTGGCC  
61 CGAACGATTC AAGAATTTGA ATGGTCCGCT TACCCGGAAA ATAGGAAAGT GGATTTtACT  
121 GAGAAATTGG AATTTACTGT GGTGATGAAA AACCTTTTAA GAGCTAAGGT CAAGCCAAGA  
181 ATGCAAGTGG TGTA  
SEQ ID 134  
LGLATVHVNLMLARTIQEFWSAYPENRKVDFTEKLEFTVVMKNPLRAKVKPRMQVV

## FIG. 68

SEQ ID 135            D185-BG2  
1 TTGGGCTTG GCAACGGTGC ATGTGAATTT GATGTTGGCC  
61 CGAATGATTC AAGAATTTGA ATGGTCCGCT TACCCGGAAA ATAGGAAAGT GGATTTACTG  
121 AGAAATTGGA ATTTACTGTG GTGA  
SEQ ID 136  
LGLATVHVNLMLARMIQEFWSAYPENRKVDLLRNWNLLW

## FIG. 69

SEQ ID 137            D185-BE1  
1 ATCACATTT GCTAAGTTTG TGAATGAGCT AGCATTGGCA  
61 AGATTAATGT TCCATTTTGA TTTCTCGCTA CCAAAGGAG TTAAGCATGA GGATTTGGAC  
121 GTGGAGGAAG CTGCTGGAAT TACTGTTAGG AGGAAGTTCC CCCTTTTAGC CGTCGCCACT  
181 CCATGCTCGT GA  
SEQ ID 138  
ITFAKFVNELALARLMFHDFSLPKGVKHEDLDVEEAAGITVRRKFPLLAVATPCS

## FIG. 70

SEQ ID 139            D185-BD2  
1 ATCACATTT GCTAAGTTTG TGAATGAGCT AGCATTGGCA  
61 AGATTAATGT TCCATTTTGA TTTCTCGCTA CCAAAGGAG TTAAGCATGC GGATTTGGAC  
121 GTGGAGGAAG CTGCTGGAAT TACTGTTAGA AGGAAGTTCC CCCTTTTAGC CGTCGCCACT  
181 CCATGCTCGT GA  
SEQ ID 140  
ITFAKFVNELALARLMFHDFSLPKGVKHADLDVEEAAGITVRRKFPLLAVATPCS

FIG. 71

SEQ ID 141                    D176-BG2  
1 CA AAATTTTGGC ATGTTAGAAG CAAAGACTAC TTTGGCTATG  
121 ATCCTACAAC GCTTCTCCTT TGAAGTGTCT CCATCTTATG CACATGCTCC TCAGTCCATA  
181 ATAACTTTGC AACCCAGTA TGGTGCTCCA CTTATTTTGC ATAAAATATA G  
SEQ ID 142  
QNFAMLEAKTTLAMILQRFSFELSPSYAHAPQSIITLQPQYGAPLILHKI

FIG. 72

SEQ ID 143                    D185-BD3  
1 ATTATCCTT GCACTGCCAA TTCTTGGCAT TACCTTGGGA  
61 CGCTTGGTGC AGAAGTTTGA GTTGTTCCTT CCTCCAGGAC AGTCAAAGCT TGACACAACA  
121 GAGAAAGGCG GGCAATTCAG TCTGCACATT TTGAAGCATT CCACCATTGT GATGAAACCA  
181 AGATCTTTTT AA  
SEQ ID 144  
IILALPILGITLGRVLQNFELLPPPGQSKLDTTEKGGQFSLHILKHSTIVMKPRSF

FIG. 73

SEQ ID 145                    D176-BC3  
1 C AAAATTTTGC CATGTTAGAA GCAAAGACTA CTTTGGCTAT  
121 GATCCTACAA CGCTTCTCCT TTGAAGTGC TCCATCTTAT GCACATGCTC CTCAGTCCAT  
181 AATAACTTGC AACCCAGTA TGGTGCTCCA CTTATTTTGC ATAAAATATA GTTTATTACT  
241 TGTAAGTAGT GTCTCGTTTT ATGTTAAGCA TGAGTCCAAA ATGTTAAGGC TTGTAGAACT  
301 GCAAATGGG AATGCATTG CACTCGTGCA CTGTAGATTG TTGTAA  
SEQ ID 146  
QNFAMLEAKTTLAMILQRFSFELSPSYAHAPQSIITCNPSMVLHLFCIKYSLLLVSSVSFYVKHESKMLRLVELQNGNA  
FALVHCRL

FIG. 74

SEQ ID 147                    D176-BB3  
1 GCTGAT  
61 ATGGGGTTGC GAGCAGTTTC TTTGGCATTG GGTGCACTTA TTCAATGCTT TGAAGTGGCA  
121 ATTGAGGAAG CGGAAAGCTT GGAGGAAAGC TATAATTCTA GAATGACTAT GCAGAACAAG  
181 CCTTTGAAGG TTGTCTGCAC TCCACGCGAA GATCTTGGCC AGCTTCTATC CCAACTCTAA  
SEQ ID 148  
ADMGLRAVSLALGALIQCFDWQIEEAESLEESYNSRMTMKNKPLKVCTPREDLGQLLSQL

FIG. 75

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NAME D89-AB1  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 149

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1 CTTCCTTCCT AAGTCCTAAC TAAAAATGGA GATTCAAGTTT TCTAACTTAG TTGCATTCTT
61 GCTCTTTCTC TCCAGCATCT TTCTTCTATT CAAAAAATGG AAAACCAGAA AACTAAATTT
121 GCCTCCTGGT CCATGGAAAT TACCTTTTAT TGGAAGTTTA CACCATTGGG CTGTGGCAGG
181 TCCACTTCCT CACCATGGCC TAAAAAATTT AGCCAAACGC TATGGTCCTC TTATGCATTT
241 ACAACTTGGA CAAATTCTTA CACTCATCAT ATCATCACCT CAAATGGCAA AAGAACTACT
301 AAAAATCACC GACCTCGCTT TTGCCACTAG ACCAAAGCTT GTCGCGGCCG ACATCATTTCA
361 CTACGACAGC ACGGACATAG CATTTTCTCC GTACGGTGAA TACTGGAGAC AAATTCGTAA
421 AATTTGCATA TTGGAACCTT TGAGTGCCAA GATGGTCAA TTTTTTAGCT CGATTCGCCA
481 AGATGAGCTC TCGAAGATGC TCTCATCTAT ACGAACGACA CCCAATCTTA CAGTCAATCT
541 TACTGACAAA ATTTTGTGGT TTACGAGTTC GGTAACCTGT AGATCAGCTT TAGGGAAGAT
601 ATGTGGTGAC CAAGACAAAT TGATCATTTT TATGAGGGAA ATAATATCAT TGGCAGGTGG
661 ATTTAGTATT GCTGATTTT TCCCTACATG GAAAATGATT CATGATATTG ATGGTTCGAA
721 ATCTAAACTG GTGAAAGCAC ATCGTAAGAT TGATGAAATT TTGGGAAATG TTGTTGATGA
781 GCACAAAAAG AACAGAGCAG ATGGCAAGAA GGGTAATGGT GAATTTGGTG GTGAAGATTT
841 GATTGATGTA TTGTTAAGAG TTAGAGAAAG TGGAGAAGTT CAAATTCCTA TCACAAATGA
901 CAATATCAAA TCAATATTAA TCGACATGTT CTCTGCAGGA TCTGAAACAT CATCGACGAC
961 TATAATTTGG GCATTAGCTG AAATGATGAA GAAACCAAGT GTTTTAGCAA AGGCACAAGC
1021 TGAAGTAAGG CAAGCTTTGA AGGAGAAAAA AGGTTTTCAA CAGATTGATC TTGATGAGCT
1081 AAAATATCTC AAGTTAGTAA TCAAAGAAAC CTTAAGAATG CACCCTCCAA TTCCTCTATT
1141 AGTTCCTAGA GAATGTATGG AGGATACAAA GATTGATGGT TACAATATAC CTTTCAAAC
1201 AAGAGTCATA GTTAATGCAT GGGCAATCGG ACGAGATCCA GAAAGTTGGG ATGACCCCGA
1261 AAGCTTTATG CCAGAGAGAT TTGAGAATAG TTCTATTGAC TTTCTTGGAA ATCATCATCA
1321 GTTTATACCA TTTGGTGCGA GAAGAAGGAT TTGTCCGGGA ATGCTATTTG GTTTAGCTAA
1381 TGTTGGACAA CCTTTAGCTC AGTTACTTTA TCACTTCGAT TGGAAACTCC CTAATGGACA
1441 AAGTCATGAG AATTTGACA TGAAGAGTC ACCTGGAATT TCTGCTACAA GAAAGGATGA
1501 TCTTGTTTTG ATTGCCACTC CTTATGATTC TTATTAAGCA GTAGCAGAAA TAAAAAGCCG
1561 GGGCAAACAG AAAAAA

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SEQ. ID. NO. 150

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1 MEIQFSNLVA FLLFLSSIFL LFKKWKTRKL NLPPGPWKLP FIGSLHHLAV AGPLPHHGLK
61 NLAKRYGPLM HLQLGQIPTL IISSPQMAKE VLKTHDLAFA TRPKLVAADI IHYDSTDI AF
121 SPYGEYWRQI RKICILELLS AKMKVFFSSI RQDELSKMLS SIRTTPNLTV NLTDKIFWFT
181 SSVTCRSALG KICGDQDKLI IFMREIISLA GGFSIADFFP TWKMIHDIDG SKSKLVKAHR
241 KIDEILGNV DEHKKNRADG KKGNGEFGGE DLIDVLLRVR ESGEVQIPIT NDNIKSILID
301 MFSAGSETSS TTIIWALAEM MKKPSVLAKA QAEVRQALKE KKGQQIDLD ELKYLKLVK
361 ETLRMHPPIP LLVPREMED TKIDGYNIPF KTRVIVNAWA IGRDPESWDD PESFMPERFE
421 NSSIDFLGNH HQFIPFGAGR RICPGMLEGL ANVGQPLAQL LYHFDWKLPN GQSHENFDMT
481 ESPGISATRK DDLVLIATPY DSY

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FIG. 76

NAME D89-AD2  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 151

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1 TCCTTCTTCC TTCCTAAGTC CTAACATAAA ATGGAGATTC AGTTTTCTAA CTTAGTTGCA
61 TTCTTGCTCT TTCTCTCCAG CATCTTTCTT CTATTCAAAA AATGGAAAAC CAGAAAATA
121 AATTTGCCTC CTGGTCCATG GAAATTACCT TTTATTGGAA GTTTACACCA TTTGGCTGTG
181 GCAGGTCCAC TTCCTCACCA TGGCCTAAAA AATTTAGCCA AACGCTATGG TCCTCTTATG
241 CATTTACAAC TTGGACAAAT TCCTACACTC ATCATATCAT CACCTCAAAT GGCAAAGAA
301 GACTAAAAA CTCACGACCT CGCTTTTGCC ACTAGACCAA AGCTTGTCGT GGCCGACATC
361 ATTCACTACG ACAGCACGGA CATAGCATTT TCTCCGTACG GTGAATACTG GAGACAAATT
421 CGTAAAATTT GCATATTGGA ACTCTTGAGT GCCAAGATGG TCAAATTTTT TAGCTCGATT
481 CGCCAAGATG AGCTCTCGAA GATGCTCTCA TCTATACGAA CGACACCCAA TCTTACAGTC
541 AATCTTACTG ACAAATTTTT TTGGTTTACG AGTTCGGTAA CTTGTAGATC AGCTTTAGGG
601 AAGATATGTG GTGACCAAGA CAAATTGATC ATTTTATGA GGGAAATAAT TCATTGGCA
661 GGTGGATTTA GTATTGCTGA TTTTTCCCT ACATGGAAAA TGATTCATGA TATTGATGGT
721 TCGAAATCTA AACTGGTGAA AGCAGATCGT AAGATTGATG AAATTTTGGG AAATGTTGTT
781 GATGAGCACA AAAAGAACAG AGCAGATGGC AAGAAGGGTA ATGGTGAATT TGGTGGTGAA
841 GATTTGATTG ATGTATTGTT AAGAGTTAGA GAAAGTGGAG AAGTTCAAAT TCCTATCACA
901 AATGACAATA TCAAATCAAT ATTAATCGAC ATGTTCTCTG CGGGATCTGA AACATCATCG
961 ACGACTATAA TTTGGGCATT AGCTGAAATG ATGAAGAAAC CAAGTGTTTT AGCAAAGGCA
1021 CAAGCTGAAG TAAGGCAAGC TTTGAAGGAG AAAAAAGGTT TTCAACAGAT TGATCTTGAT
1081 GAGCTAAAAT ATCTCAAGTT AGTAATCAAA GAAACCTTAA GAATGCACCC TCCAATTCCT
1141 CTATTAGTTC CTAGAGAATG TATGGAGGAT ACAAAGATTG ATGGTTACAA TATACCTTTC
1201 AAAACAAGAG TCATAGTTAA TGCATGGGCA ATCGGACGAG ATCCAGAAAG TTGGGATGAC
1261 CCCGAAAGCT TTATGCCAGA GAGATTGAG AATAGTTCTA TTGACTTTCT TGGAAATCAT
1321 CATCAGTTTA TACCATTGTTG TGCAGGAAGA AGGATTTGTC CGGGAATGCT ATTTGGTTTA
1381 GCTAATGTTG GACAACCTTT AGCTCAGTTA CTTTATCACT TCGATTGGAA ACTCCCTAAT
1441 GGACAAAGTC ATGAGAATTT CGACATGACT GAGTCACCTG GAATTTCTGC TACAAGAAAG
1501 GATGATCTTG TTTTGATTGC CACTCCTTAT GATTCTTATT AAGCAGTAGC AGAATAAAAA
1561 AGCCGGGGCA AACAGAAAAA A

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SEQ. ID. NO. 152

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1 MEIQFSNLVA FLLFLSSIFL LFKKWKTRKL NLPPGPWKLP FIGSLHHLAV AGPLPHHGLK
61 NLAKRYGPLM HLQLGQIPTL IISPPQMAKE VLKTHDLAFA TRPKLVVADI IHYDSTDIAF
121 SPYGEYWRQI RKICILELLS AKMVKFFSSI RQDELSKMLS SIRTTPNLTV NLTDKIFWFT
181 SSVTCRSALG KICGDQDKLI IFMREIISLA GGFSIADFFP TWKMIHDIDG SKSKLVKAHR
241 KIDEILGNVV DEHKKNRADG KKGNGEFGGE DLIDVLLRVR ESGEVQIPIT NDNIKSILID
301 MFSAGSETSS TTIIWALAEM MKKPSVLAKA QAEVRQALKE KKGFGQIDLD ELKYLKLVIK
361 ETLRMHPPIP LLVPRECMED TKIDGYNIPF KTRVIVNAWA IGRDPESWDD PESFMPERFE
421 NSSIDFLGNH HQFIPFGAGR RICPGMLFGL ANVGQPLAQL LYHFDWKLPN GQSHENFDMT
481 ESPGISATRK DDLVLIATPY DSY

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FIG. 77

NAME D90A-BB3  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 153

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1 CAACTGCAGT TTGAAGATAC CAACTAACCA AAATGCAGTT CTTCAGCTTG GTTTCATT
61 TCCTATTTCT ATCTTTTCTC TTTTGTGTTA GGAAATGGAA GAACTCGAAT AGCCAAAGGA
121 AAAAATTGCC ACCAGGTCCA TGGAAACTAC CAATACTAGG AAGTATGCTT CATATGGTTG
181 GTGGACTACC ACACCATGTC CTTAGAGATT TAGCCAAAAA ATATGGACCG CTTATGCACC
241 TTCAATTAGG TGAAGTTTCT GCAGTTGTGG TTACTTCTCC TGATATGGCA AAAGAAGTAC
301 TAAAACTCA TGACATCGCT TTCGCGTCTA GGCCTAGCCT TTTGGCCCCG GAGATTGTCT
361 GTTACAATAG GTCTGATCTT GCGTTTTGCG CCTATGGCGA TTATTGGAGA CAAATGCGTA
421 AAATATGTGT CTTGGAAGTG CTCAGTGCCA AGAATGTTTCG GACATATAGC TCTATTAGGC
481 GCGATGAAGT TCTTCGTCTC CTTAATTTTA TCCGGTCATC TTCTGGTGAG CCGTGAATA
541 TTACGGAAAG GATCTTTTTC TTCACAAGCT CCATGACATG TAGATCAGCG TTTGGGCAAG
601 TATTCAAGGA GCAAGACAAA TTTATACAAC TAATTAAAGA AGTTATACTC TTAGCAGGAG
661 GGTTTGATGT GGCTGACATA TTCCCTTCAT ACAAGTCTCT TCATGTGCTC AGTGAATGA
721 AGGGTAAGAT TATGAATGCA CACCATAAGG TAGATGCTAT TGTGAGAAT GTCATCAACG
781 AGCACAAGAA AAATCTTGCA ATTGGGAAAA CTAATGGAGC GTTAGGAGGT GAAGATTTAA
841 TTGATGTTCT TCTAAACTTT ATGAATGATG GAGGCCTTCA ATTCCTATC ACCAACGACA
901 ACATCAAAGC TATAATCTTT GACATGTTTG CTGCTGGAAC AGAGACTTCA TCGTCAACAA
961 TTGTGTGGGC TATGGTGGAA ATGGTGAAAA ATCCAAGTGT ATTTGCGAAA GCTCAAGCAG
1021 AAGTAAGAGA TGCATTTAGA GAAAAAGAAA CTTTGTATGA AAATGATGTG GAGGAGCTAA
1081 ACTATCTAAA GTTAGTCATT AAAGAACTC TAAGACTTCA TCCACCGGTT CCACTTTTGC
1141 TCCAAGAGA ATGTAGGGAA GAGACAAATA TAAACGGCTA CACTATTCCT GTAAAGACCA
1201 AAGTCATGGT TAATGTTTGG GCATTGGGAA GAGATCCAAA ATATTGGGAT GATGCAGAAA
1261 CTTTTAAGCC AGAGAGATTT GAGCAGTGCT CTAAGGATTT TGTGAGTAAT AATTTTGAAT
1321 ATCTTCCATT TGGTGGTGGA AGGAGGATTT GTCCAGGGAT TTCGTTTGGT TTAGCTAATG
1381 CTTATTTGCC ATTGGCTCAA TTACTTTATC ACTTTGATTG GGAAGTCCCC ACTGGAATCA
1441 AACCAGCGA CTTGGACTTG ACTGAGTTGG TTGGAGTAAC TGCCGCTAGA AAAAGTGACC
1501 TTTACTTGGT TGCGACTCCT TATCAACCTC CTCAAAAC

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SEQ. ID. NO. 154

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1 MQFFSLVSIF LFLSFLFLLR KWKNSNSQRK KLPPGPWKLP ILGSMMLHMGV GLPHHVLRLD
61 AKKYGPLMHL QLGEVSAVVV TSPDMAKEVL KTHDIAFASR PSLLAPEIVC YNRSDLAFCP
121 YGDYWRQMRK ICVLEVLAK NVRTYSSIRR DEVLRLNFI RSSSGEPVNI TERIFLFTSS
181 MTCRSAFGQV FKEQDKFIQL IKEVILLAGG FDVADIFPSY KSLHVLSGMK GKIMNAHHKV
241 DAIVENVINE HKKNLAIGKT NGALGGEDLI DVLLKLMNDG GLQFPITNDN IKAIIFDMFA
301 AGTETSSSTI VWAMVEMVKN PTVEFAKAQAE VRDAFREKET FDENDVEELN YLKLVIKETL
361 RLHPPVPLLL PRECREETNI NGYTIPVTK VMNVWALGR DPKYWDDAET FKPERFEQCS
421 KDFVGNNEFY LPFGGGRRIC PGISFGLANA YLPLAQLLYH FDWELPTGIK PSDLDLTEL
481 GVTAARKSDL YLVATPYQPP QN

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FIG. 78

NAME D95-AG1  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 155

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1 AAAAGATGTC TTCATTTTCC ACATCTTCTG CCACTTCTAA TTCCAAACTT CCAGTTCGAG
61 AAATCCCAGG AGACTATGGT TTCCCCTTTT TTGGAGCCAT AAAAGATAGA TATGACTACT
121 TCTACAACCT CGGCACAGAC GAATTCCTTC TTACCAAAAT GCAAAAATAC AACTCTACTG
181 TCTTTAGAAC CAACATGCCA CCAGGTCCAT TCATTGCTAA AAATCCCAA GTAATTGTTT
241 TCCTCGATGC CAAAACATTT CCCGTTCTTT TCGACAACTC TAAAGTCGAA AAAATGAACG
301 TTCTTGATGG CACGTACGTG CCATCTACTG ATTTCTATGG CGGATATCGC CCGTGTGCTT
361 ATCTTGATCC TTCTGAGTCA ACTCATGCCA CACTTAAAGG GTTCTTTTTA TCTTTAATCT
421 CCCAGCTTCA TAATCAATTT ATTCCTTTAT TTAGAACCCTC AATTTCTGGT CTTTTCGCAA
481 ATCTTGAGAA TGAGATTTCC CAAAATGGCA AAGCGAACTT CAACAATATC AGCGACATTA
541 TGTCAATCGA TTTTGTTTTT CGTTTGTTAT GTGACAAGAC CAGTCCCCAT GACACAAATC
601 TTGGCTCTAA TGGACCAAAA CTCTTTGATA TATGGCTGTT GCCTCAACTT GCTCCATTGT
661 TTAGTCTAGG TCTAAAATTT GTGCCGAAT TTCTGGAAGA TTTAATGTTG CATACTTTTC
721 CCTTGCCATT TTTTCTAGTG AGATCGAAT ACCAGAAGCT TTATGATGCT TTTAGCAAGC
781 ATGCCGAAAG TACACTGAAT GAAGCAGAGA AGAATGGGAT CAAAAGAGAC GAAGCATGCC
841 ACAACTTAGT TTTTCTTGCA GGTTCATG CTTATGGTGG GATGAAAGTT TTATTCCCTG
901 CACTGATAAA GTGGGTCGCC AATGGAGGAA AGAGTTTACA CACTCGGCTG GCAAATGAAA
961 TCAGGACAAT TATCAAAGAA GAATGTGGGA CCATAACTCT ATCAGCAATC AACAAGATGA
1021 GTTTAGTAAA ATCAGTAGTG TATGAAGTAT TAAGAATTGA ACCTCCAGTT CCATTCCAAT
1081 ATGGTAAAGC CAAAGAAGAT ATCATAATCC AAAGCCATGA TTCAACTTTC TTAGTCAAGA
1141 AAGGTGAAAT GATCTTTGGA TATCAGCCTT TTGCTACAAA AGATCCAAAG ATTTTTGACA
1201 AACCAGAGGA GTTTATTCCG GAGAGGTTCA TGGCCGAAGG GGAAAAATTA TTAAAGTATG
1261 TGTATTGGTC AAATGCAAGA GAGACAGATG ATCCAACGGT GGACAACAAA CAATGCCAG
1321 CGAAAAATCT TGTCGTGCTT TTGTGCAGGT TGATGTTGGT GGAGGTTTTT ATGCGTTACG
1381 ACACATTAC AGTGGAGTCA ACAAAGCTCT TTCTTGGGTC ATCAGTAACG TTCACGACTC
1441 TGGAAAAAGC GACATGAGTT TCAGATATCT TAATTGTAGG CTGCAAATAA TAATGTGGTC
1501 ATTCTGCAAA TTATTGTACT TGTGCTGATG

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SEQ. ID. NO. 156

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1 MSSFSTSSAT SNSKLPVREI PGDYGFPFFG AIKDRYDYFY NLGTDEFFLT KMQKYNSTVF
61 RTNMPPPGPI AKNPKVIVLL DAKTFPVLFD NSKVEKMNVL DGTYPSTDF YGGYRCPAYL
121 DPSESTHATL KGFFLSLISQ LHNQFIPLFR TSISGLFANL ENEISQNGKA NFNINISDIMS
181 PDEFVFRLLCD KTSPhDTNLG SNGPKLFEDIW LLPQLAPLFS LGLKFVPNFL EDIMLHTEPL
241 PFFLVRSNYQ KLYDAFSKHA ESTLNEAEKN GIKRDEACHN LVFLAGFNAY GGMKVLFPAL
301 IKWVANGGKS LHTRLANEIR TIIKEECGTI TISAINKMSL VKSVVYEVLR IEPPVPFQYG
361 KAKEDIIIQS HDSTFLVKKG EMIFGYQPPA TKDPKIFDKP EEFIPERFMA EGEKLLKYVY
421 WSNARETDDP TVDNKQCPAK NLVVLLCRLM LVEVFMRYDT FTVESTKLFL GSSVFTTLE
481 KAT

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FIG. 79

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NAME D96-AB6  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 157

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1 CCAAAAATGG AGCTTCAATC TTCTCCTTTC AATTTAATTT CTTTGTTCTT CTTCTTTTCT
61 TTTCAATTTA TTCTAGTGAA GAAATGGAAT GCCAAAATCC CAAAGTTACC TCCAGGTCCG
121 TGGAGGCTTC CCTTTATTGG AAGCCTCCAT CACTTGAAGG GAAAACCTCC ACACCATAAT
181 CTTAGAGATC TAGCGCGAAA ATATGGGCCT CTCATGTACT TACAACTCGG AGAAATTCCT
241 GTAGTTGTAA TATCTTCGCC ACGTGTAGCA AAAGCTGTAC TAAAAACTCA TGATCTCGCT
301 TTTGCAACTA GACCACGATT CATGTCCTCA GACATTGTGT TTTACAAAAG CAGGGACATC
361 TCTTTTGCCC CATTTGGTGA TTACTGGAGA CAGATGCGTA AAATATTGAC TCAGGAACCTC
421 CTGAGTAACA AGATGCTCAA GTCATATAGC TTAATCCGAA AGGATGAGCT CTCGAAGCTC
481 CTCTCATCGA TTCGTTTGGA AACAGGTTCT GCAGTGAACA TAAATGAAAA GCTTCTCTGG
541 TTTACGAGCT GCATGACCTG TAGATTAGCC TTTGGAAAAA TATGCAATGA TCGGGATGAG
601 TTGATCATGC TAATTAGGGA GATATTAACA TTATCAGGAG GATTTGATGT GGGTGATTTG
661 TTCCCTTCCT GGAAATTACT TCATAATATG AGCAACATGA AAGCTAGGTT GACGAATGTA
721 CACCACAAGT ATGATTTAGT TATGGAGAAC ATCATCAATG AGCACCAAGA GAATCATGCA
781 GCAGGGATAA AGGGTAACAA CGAGTTTGGT GGCGAAGATA TGATCGATGC TCTACTGAGG
841 GCTAAGGAGA ATAATGAGCT TCAATTTCTT ATCGAAAATG ACAACATGAA AGCAGTAATT
901 CTGGACTTGT TTATTGCTGG AACTGAAACT TCATATACTG CAATTATATG GGCACATATC
961 GAATTGATGA AGCACCCAAG TGTGATGGCC AAGGCACAAG CTGAAGTGAG AAAAGTCTTC
1021 AAAGAAAAATG AAAATTTCTGA CGAAAATGAT CTTGACAAGT TGCCATACTT AAAATCAGTG
1081 ATTAAAGAAA CACTAAGGAT GCACCCTCCA GTTCCTTTGT TAGGGCCTAG AGAATGCAGG
1141 GACCAAACAG AGATCGATGG CTACACTGTA CCTATTAAAG CTAGAGTTAT GGTAAATGCT
1201 TGGGCGATAG GAAGAGATCC TGAAAGTTGG GAAGATCCTG AAAGTTTCAA ACCGGAGCGA
1261 TTTGAAAATA CTTCTGTTGA TCTTACAGGA AATCACTATC AGTTCATTCC TTTCGGTTCA
1321 GGAAGAAGAA TGTGTCCAGG AATGTCGTTT GGTTTAGTTA ACACAGGGCA TCCTTTAGCC
1381 CAGTTGCTCT ATTGCTTTGA CTGGAAACTC CCTGACAAGG TTAATGCAAA TGATTTTCGC
1441 ACTACTGAAA CAAGTAGAGT TTTTGCAGCA AGCAAAGATG ACCTCTACTT GATTCCCACA
1501 AATCACAGGG AGCAAGAATA GCTTAATTTA ATGGAGTTCT TGAAGAATT AAAGAAGAAG
1561 GGCTATATAG GTGAGATTTT TTGTATGGTT GCA

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SEQ. ID. NO. 158

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1 MELQSSPFNL ISLFLFFSFH FILVKWNAK IPKLPPGPWR LPFIGSLHHL KGKLPHHNLK
61 DLARKYGPLM YLQLGEIPVV VISSPRVAKA VLKTHDLAFA TRPRFMSSDI VFYKSRDISF
121 APFGDYWRQM RKILTQELLS NKMLKSYSLI RKDELSKLLS SIRLETGSV NINEKLLWFT
181 SCMTCRLAFG KICNDRDELI MLIREILTLS GGFVGDLEP SWKLLHNMSN MKARLTNVHH
241 KYDLVMENII NEHQENHAAG IKGNNEFGGE DMIDALLRAK ENNELQFPIE NDNMKAVILD
301 LFIAGTETSY TAIIWALSEL MKHPSVMAKA QAEVRKVFKE NENFDENDLD KLPYLKSVIK
361 ETLRMHPPVP LLGPRECRDQ TEIDGYTVPI KARVMVNAWA IGRDPESWED PESFKPERFE
421 NTSVDLTGNH YQFIPFGSGR RMCPGMSFGL VNTGHPLAQL LYCFDWKLPD KVNANDFRTT
481 ETSRVFAASK DDLYLIPTNH REQE

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FIG. 80

NAME D96-AC2  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 159

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1 CTTCTTCCAA AAATGGAGCT TCAATCTTCT CCTTTC AATT TAATTTCTTT GTTCCTCTTC
61 TTTTCTTTTC TTTTATTCT AGTGAAGAAA TGGAATGCCA AAATCCCAA GTTACCTCCA
121 GGTCCGTGGA GGCTTCCCTT TATTGGAAGC CTCCATCACT TGAAGGGAAA ACTTCCACAC
181 CATAATCTTA GAGATCTAGC GCGAAAATAT GGACCTCTCA TGTACTTACA ACTCGGAGAA
241 ATTCTGTAG TTGTAATATC TTCGCCACGT GTAGCAAAAG CTGTACTAAA AACTCATGAT
301 CTCGCTTTTG CAACTAGACC ACGATTCATG TCCTCAGACA TTGTGTTTTA CAAAAGCAGG
361 GACATCTCTT TTGCCCCATT TGGTGATTAC TGGAGACAGA TGCGTAAAAT ATTGACTCAG
421 GAACTCCTGA GTAACAAGAT GCTCAAGTCA TATAGCTTAA TCCGAAAGGA TGAGCTCTCG
481 AAGCTCCTCT CATCGATTCT TTTGGAAACA GGTTCTGCAG TGAACATAAA TGAAAAGCTT
541 CTCTGGTTTA CGAGCTGCAT GACCTGTAGA TTAGCCTTTG GAAAAATATG CAATGATCGG
601 GATGAGTTGA TCATGCTAAT TAGGGAGATA TTAACATTAT CAGGAGGATT TGATGTGGGT
661 GATTGTGTTCC CTTCTGGAA ATTACTTCAT AATATGAGCA ACATGAAAGC TAGGTTGACG
721 AATGTACACC ACAAGTATGA TTTAGTTATG GAGAACATCA TCAATGAGCA CCAAGAGAAT
781 CATGCAGCAG GGATAAAGGG TAACAACGAG TTTGGTGGCG AAGATATGAT CGATGCTCTA
841 CTGAGGGGCTA AGGAGAATAA TGAGCTTCAA TTTCTATCG AAAATGACAA CATGAAAGCA
901 GTAATTCTGG ACTTGTTTAT TGCTGGAAC TAACTTCAT ATACTGCAAT TATATGGGCA
961 CTATCAGAAT TGATGAAGCA CCCAAGTGTG ATGGCCAAGG CACAAGCTGA AGTGAGAAAA
1021 GTCTTCAAAG AAAATGAAAA TTTTCGACGAA AATGATCTTG ACAAGTTGCC ATACTTAAAA
1081 TCAGTGATTA AAGAAACACT AAGGATGCAC CCTCCAGTTC CTTTGTAGG GCCTAGAGAA
1141 TGCAGGGACC AAACAGAGAT CGATGGCTAC ACTGTACCTA TTAAAGCTAG AGTTATGGTT
1201 AATGCTTGGG CGATAGGAAG AGATCCTGAA AGTTGGGAAG ATCCTGAAAG TTTCAAACCG
1261 GAGCGATTTG AAAATACTTC TGTGATCTT ACAGGAAATC ACTATCAGTT CATTCTTTTC
1321 GGTTTCAGGAA GAAGAATGTG TCCAGGAATG TCGTTTGGTT TAGTTAACAC AGGGCATCCT
1381 TTAGCCCAGT TGCTCTATTG CTTTGACTGG AAACCTCCCTG ACAAGGTTAA TGCAAATGAT
1441 TTTTCGACTA CTGAAACAAG TAGAGTTTTT GCAGCAAGCA AAGATGACCT CTACTTGATT
1501 CCCACAAATC ACAGGGAGCA AGAATAGCTT AATTTAATGG AGTTCTTGGA AGAATTAAAG
1561 AAGAAGGGCT ATATAGGTGA GATTTTTTGT ATGGTTGCA

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SEQ. ID. NO. 160

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1 MELQSSPFNL ISLFLFFSFL FILVKKWNAK IPKLPPGPWR LPFIGSLHHL KGKLPHHNLR
61 DLARKYGPLM YLQLGEIPVV VISSPRVAKA VLKTHDLAFA TRPRFMSSDI VFYKSRDISF
121 APFGDYWRQM RKILTQELLS NKMLKSYSLI RKDELSKLLS SIRLETGSAV NINEKLLWFT
181 SCMTCRLAFG KICNDRDELI MLIREILTLS GGFDVGLFP SWKLLHNMSN MKARLTNVHH
241 KYDLVMENII NEHQENHAAG IKGNNEFGGE DMIDALLRAK ENNELQFPPIE NDNMKAVILD
301 LFIAGTETSY TAIIWALSEL MKHPSVMAKA QAEVRKVFKE NENFDENDLD KLPYLKSVIK
361 ETLRMHPPVP LLGPRECRDQ TEIDGYTVPI KARVMVNAWA IGRDPESWED PESFKPERFE
421 NTSVDLTGNH YQFIFPGSGR RMCPGMSFGL VNTGHPLAQL LYCFDWKLPD KVNANDFRTT
481 ETSRVFAASK DDLYLIPTNH REQE

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FIG. 81

NAME D98-AA1  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 161

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1 CTTTCTTTCT TGTACCGAGA TGGAGTTTCA ACACTTGGTT TCGTTCCTTG C TATTCATCTC
61 CTTTCATCTTT CTTCTAATTC AAAAATGGAG GAAATCGAAA AAGCTGCCAC CTGGTCCGTG
121 GAGGCTACCT ATTATTTGGAA GTGTGCATCA CTTGACAAGT GGAGTACCAC ATCGAGTTCT
181 CAGAAATTTA TCACAAAAT TGGGCCCCGAT CATGTACTTG CAGCTCGGGG AAGTCCCAC
241 AGTAGTTGTA TCCTCCCCAC ACATGGCCAA ACAAATTTTA AAACTCATG ACCTCGCTTT
301 TGCATCTAGG CCAGAAATCA TGATGGGAAA AATTATTTGC TACGATTGTA AGGACATTGC
361 CTTTTCCCCG TATGGTGATT ATTGGAGACA TATGCGTAAA TTGAGCACCT TGGAACTACT
421 TAGTGCCAAG ATGGTCAAGT CCTTCAGTCC AATTCGTCAA GATGAGCTCT CAAGTCTCCT
481 ATCATCCATT GAATCAATGG GAAATTTGCC AATCAACTTA GTAGAAAAAC TTTTATGGTT
541 TATGAATGCC GCGACATGTA GGTGAGCATT TGGGAAAGTG TGTAAGATC AAAAAGAGTT
601 GATAACATTG ATTCAACGAG CAGAATCATT ATCTGGTGGG TCGAGCTGG TCGATTGTT
661 CCCTTCGAAG AAGTTTCTAC ATGGTATTAG TGGGATGCGA TCTAACTAA TGGAAAGCTCG
721 TAACAAGATA GACGCACTCT TGGACAACAT TATCAATGTG CACAGAGAGA ATCGGGCAAA
781 TGGAAATAGT TGTAATGGTG AGTCTGGAAC TGTAAGTTTC ATCGATGTTT TTCTAAGGTT
841 CATGGAGAGT GGCGAATTAC CATTTCCGAT AGAAAATGAC AACATCAAAG CAGTTATTCT
901 TGACATGTTT GTAGCAGGAT CTGACACATC ATCTTCAACC GTTATTTGGG CATTAACAGA
961 AATGATGAAG AATCCAAAAG TCATGGCTAA AGCACAAGCT GAAGTGAGAG AAGCTTTTAA
1021 AGGAAAGAAA GCATGTGATG AGGATACTGA TCTTGAAAAG CTTCATTACC TAAATTTAGT
1081 GATCAAAGAG ACACTCCGAT TACACCCTCC AACTCCTCTA CTTGTCCCGC GAGAATGCAG
1141 GGAGGAAACA GAGATAGAAG GATTCACTAT ACCATTGAAA AGCAAAGTCT TGGTTAACGT
1201 ATGGGCAATT GGAAGAGATC CCGAGAATTG GAAAAATCCT GAATGTTTTA TACCAGAGAG
1261 ATTCGAAAAT AGTTCTATTG AGTTTACTGG AAATCATTTT CAACTTCTTC CGTTTGGCGC
1321 TGGAAGACGA ATTTGTCCAG GAATGCAATT TGGTTTGGCT CTTGTTACTC TGCCATTGGC
1381 TCATTTGCTT CACAATTTTG ATTGGAAACT TCCCGAAGGA ATTAATGCAA GGGATTTGGA
1441 CATGACAGAG GCAAATGGGA TATCTGCTAG AAGAGAAAAA GATCTTTACT TGATTGCTAC
1501 TCCTTATGTA TCACCTCTTG ATTAACCTCG AAATTTTGCT TTAATGCTGC TTGCTTGCTT
1561 CACT

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SEQ. ID. NO. 162

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1 MEFQHLVSFL LFISFIFLLI QKWRKSKKLP PGPWRLPIIG SVHHLTSGVP HRVLRNLSQK
61 FGPIMYLQLG EVPTVVVSSP HMAKQILKTH DLAFASRPEI MMGKIICYDC KDIAFSPYGD
121 YWRHMRKLST LELLSAKMVK SFSPIRQDEL SLLSSIESM GNLPINLVEK LLWFMNAATC
181 RSAFGKVCKD QKELITLIQR AESLSGGFEL ADLFPSKKFL HGISGMRSKL MEARNKIDAV
241 LDNIINVHRE NRANGNSCNG ESGTVDFIDV FLRVMESGEL PFPIENDNIK AVILDMFVAG
301 SDTSSSTVIW ALTEMMKNPK VMAKAQAEVR EAFKGKKACD EDTDLEKLHY LNLVIKETLR
361 LHPPTPLLVP RECREETEIE GTIPLKSKV LVNVWAIGRD PENWKNPECF IPERFENSSI
421 EFTGNHFQLL PFGAGRRICP GMPQGLALVT LPLAHLHNF DWKLPEGINA RDLDMTEANG
481 ISARREKDLY LIATPYVSPL D

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FIG. 82

NAME D98-AG1  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 163

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1 CTTTCTTGTA CCGAGATGGA GTTTC AACAC TTGGTTTCGT TCTTGCTATT CATCTCCTTC
61 ATCTTTCTTC TAATTC AAAA ATGGAGGAAA TCGAAAAAGC TGCCACCTGG TCCGTGGAGG
121 CTACCTATTA TTGGAAGTGT GCATCACTTG ACAAGTGGAG TACCACATCG AGTTCTCAGA
181 AATTTATCAC AAAAATTG CCGATCATG TACTTGCAGC TCGGGGAAGT TCCCACAGTA
241 GTTGATCACT CCCACACAT GGCCAAACAA ATTTTAAAAA CTCATGACCT CGCTTTTGCA
301 TCTAGGCCAG AAATCATGAT GGGAAAAATT ATTTGCTACG ATTGTAAGGA CATTGCCTTT
361 TCCCCGTATG GTGATTATTG GAGACATATG CGTAAATTGA GCACCTTGGA ACTACTTAGT
421 GCCAAGATGG TCAAGTCCTT CAGTCCAATT CGTCAAGATG AGCTCTCAAG TCTCCTATCA
481 TCCATTGAAT CAATGGGAAA TTTGCCAATC AACTTAGTAG AAAAAGCTTT ATGGTTTATG
541 AATGCCGCGA CATGTAGGTC AGCATTG TGGG AAAGTGTGTA AAGATCAAAA AGAGTTGATA
601 ACATTGATTC AACGAGCAGA ATCATTATCT GGTGGATTCG AGCTGGCTGA TTTGTTCCCT
661 TCGAAGAAGT TTCTACATGG TATTAGTGGG ATGCGATCTA AACTAATGGA AGCTCGTAAC
721 AAGATAGACG CAGTCTTGGA CAACATTATC AATGTGCACA GAGAGAATCG GGCAAATGGA
781 AATAGTTGTA ATGGTGAGTC TGGAACTGTA GATTTTCATCG ATGTTTTTCT AAGGGTCATG
841 GAGAGTGGCG AATTACCATT TCCGATAGAA AATGACAACA TCAAAGCAGT TATTCTTGAC
901 ATGTTCTAG CAGGATCTGA CACATCATCT TCAACCGTTA TTTGGGCATT AACAGAAACG
961 ATGAAGAATC CAAAAGTCAT GGCTAAAGCA CAAGCTGAAG TGAGAGAAGC TTTTAAAGGA
1021 AAGAAAGCAT GTGATGAGGA TACTGATCTT GAAAAGCATC ATTACCTAAA TTTAGTGATC
1081 AAAGAGACAC TCCGATTACA CCCTCCAACT CCTCTACTTG TCCCGCGAGA ATGCAGGGAG
1141 GAAACAGAGA TAGAAGGATT CACTATACCA TTGAAAAGCA AAGTCTTGGT TAACGTATGG
1201 GCAATTGGAA GAGATCCCGA GAATTGGAAA AATCCTGAAT GTTTTATAAC AGAGAGATTC
1261 GAAAATAGTT CTATTGAGTT TACTGGAAAT CATTTTCAAC TTCTTCCGTT TGGCGCTGGA
1321 AGACGAATTT GTCCAGGAAT GCAATTGGT TTGGCTCTTG TTACTCTGCC ATTGGCTCAT
1381 TTGCTTCACA ATTTTGATTG GAAACTTCCC GAAGGAATTA ATGCAAGGGA TTTGGACATG
1441 ACAGAGGCAA ATGGGATATC TGCTAGAAGA GAAAAAGATC TTTACTTGAT TGCTACTCCT
1501 TATGTATCAC CTCTTGATTA ACTCTGAAAT TTTGCTTTAA TGCTGCTTGC TTGCTTCACT

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SEQ. ID. NO. 164

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1 MEFQHLVSFL LFISFIFLLI QKWRKSKKLP PGPWRLPIIG SVHHLTSGVP HRVLRNLSQK
61 FGPIMYLQLG EVPTVVVSSP HMAKQILKTH DLAFASRPEI MMGKIICYDC KDIAFSPYGD
121 YWRHMRKLST LELLSAKMVK SFSPIRQDEL SLLSSIESM GNLPINLVEK LLWFMNAATC
181 RSAFGKVCKD QKELITLIQR AESLSGGFEL ADLFPSKKFL HGISGMRSKL MEARNKIDAV
241 LDNIINVHRE NRANGNSCNG ESGTVDFIDV FLRVMESEGL PFPIENDNIK AVILDMFVAG
301 SDTSSSTVIW ALTETMKNPK VMAKAQAEVR EAFKGGKACD EDTDLEKHHY LNLVIKETLR
361 LHPPTPLLVP RECREETEIE GFTIPLKSKV LVNVWAIGRD PENWKNPECF IPERFENSSI
421 EFTGNHFQLL PFGAGRRICP GMQFGLALVT LPLAHLHNF DWKLPEGINA RDLDMTEANG
481 ISARREKDLI LIATPYVSPL D

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FIG. 83

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NAME D100-BE2  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 165

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1 CAAAAACAAA ATTCCAATGG TTAACATGTT CACTCCAATT ATATACGCTC CTCTCCTTTT
61 AGCTTTTTTAC ATTATCACAA AACATTTCTT ACGCAAACCTC AGAAATAATC CACCAGCTCC
121 ATTTCTTACT TTCCCCTTTA TTGGCCATCT TTATCTCTTC AAAAAACCAC TTCAACGTAC
181 CTTAGCCAAA ATCTCCGAAC GTTATGGCTC TGTTCCTTCTA CTCGAATTCG GTTCACGAAA
241 AGTACTTTTG GTTTCTTCAC CATCTGCAGC TGAAGAATGC TTAACAAAAA ACGATATTAT
301 TTTCGCGAAT CGTCCTCTTT TGATGGCTGG AAAACATCTT GGATATAATT TTACATCTTT
361 GGCTTGGAGT TCGTACGGAG ATCATTTGGAG AAATCTGCGA AGGATTACTT CAGTTGAGAT
421 GTTTTCGACT CATCGTCTTC AAATGCTACA TGGGATTCGT ATTGATGAAG TGAAATCTAT
481 GGTTAAGAGG CTCAATTCCT CTGCCATAGC TGAAAAATCT GTGGATATGA AGTCTATGTT
541 TTTTGAGCTG ATGCTCAATG TTATGATGAG GACAATTGCT GGAAAAAGAT ATTACGGTGA
601 GAATGTGGAG GACATTGAGG AAGCTACGAG ATTCAAAGGT TTGGTGCAAG AGACTTTCAG
661 GATTGGCGGG GCGACGAATA TTGGCGACTT TTTGCCGGCG TTGAAGTTAT TGGTGAGGAA
721 ATTGGAGAAA AGTTTAATTG TGTGCAAGA GAACAGAGAT GAGTTTATGC AGGAATTAAT
781 TAAAGATTGC AGAAAAAGAA TGGAGAAAGA AGGTACTGTT ACTGATTCAG AAATTGAAGG
841 GAACAAGAAA TGTTTAATTG AAGTTTTGTT AACACTACAA GAAAATGAAC CGGAATACTA
901 CAAAGATGAA ATCATCAGAA GCCTTATGCT TGTTCCTATTA TCAGCTGGTA CAGATACTTC
961 AGTTGGGACA ATGGAATGGG CTTTATCATT AATGTTAAAC CACCCTGAAA CTCTGAAGAA
1021 AGCACAAGCT GAAATTGATG AACATATAGG ACATGAACGT TTAGTGGACG AGTCGGACAT
1081 CAACAACCTA CCTTACCTAC GTTGTATAAT CAACGAGACA TTCCGAATGT ACCCTGCAGG
1141 ACCACTACTA GTCCACACAG AGTCGTCAGA GGAAACCACC GTAGGAGGCT ACCGTGTACC
1201 CGGAGGAACC ATGTTACTTG TGAATTTGTG GGCAATTCAC AATGATCCAA AGCTATGGGA
1261 TGAACCAAGA AAGTTTAAAC CAGAAAGATT TCAAGGACTA GATGGTGTTA GAGATGGTTA
1321 CAAAATGATG CCTTTTGGTT CTGGACGAAG GAGTTGTCCT GGAGAAGGAT TGGCTGTTTCG
1381 AATGGTTGCC TTGTCAATTG GATGTATTAT TCAATGTTTT GATTGGCAAC GAATCGGCCA
1441 AGAATTGGTT GATATGACTG AAGGAACTGG ACTTACTTTG CCTAAAGCTC AACCTTTGGT
1501 GGCCAAGTGT AGCCCACGAC CTAAAATGGC TAATCTTCTC TCTCAGATT GA

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SEQ. ID. NO. 166

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1 MVNMFPTPIY APLLLAFYII TKHFLRKLNRN NPPAPFLTFP FIGHLYLFKK PLQRTLAKIS
61 ERYGSVLLLE FGSRKVLLVS SPSAAEECLT KNDIIFANRP LLMAGKHLGY NFTSLAWSSY
121 GDHWRNLRR I TSVMFSTHR LQMLHGIRID EVKSMVKRLN SSAIAEKSVD MKSMFFELML
181 NVMMRTIAGK RYYGENVEDI EEATRFKGLV QETFRIGGAT NIGDFLPALK LLVRKLEKSL
241 IVLQENRDEF MQELIKDCRK RMEKEGTVD SEIEGNKKCL IEVLLTLQEN EPEYYKDEII
301 RSLMLVLLSA GTDTSVGTME WALSLMLNHP ETLKKAQAEI DEHIGHERLV DESDINNLPY
361 LRCIINETFR MYPAGPLLVP HESSEETTVG GYRVPGGTML LVNLWAIHND PKLWDEPRKF
421 KPERFQGLDG VRDGYKMMPF GSGRRSCPGE GLAVRMVALS LGCI IQCFDW QRIGEELVDM
481 TEGTGLTLPK AQPLVAKCSP RPKMANLLSQ I

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FIG. 84

NAME D100A-AC3  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 167

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1 CAAAAACAAA ATTCCAATGG TTAACATGTT CACTCCAATT ATATACGCTC CTCTCCTTTT
61 AGCTTTTAC ATTATCACAA AACATTTCTT ACGCAAACCTC AGAAATAACC CACCAGCTCC
121 ATTTCTTACT TTCCCCTTTA TTGGCCATCT TTATCTCTTC AAAAAACCAC TTCAACGTAC
181 CTTAGCCAAA ATCTCCGAAC GTTATGGCTC TGTTCCTCTA CTCGAATTCG GTTCACGAAA
241 AGTACTTTTG GTTCTTTCAC CATCTGCAGC TGAAGAATGC TTAACAAAAA ACGATATTAT
301 TTTCGCGAAT CGTCCTCTTT TGATGGCTGG AAAACATCTT GGATATAATT TTAATTCTTT
361 GGCTTGGAGT TCGTACGGAG ATCACTGGAG AAATCTTCGT AGGATTACTT CAGTTGAGAT
421 GTTTTCGACT CATCGTCTTC AAATGCTACA TGGAAATTCGT ATTGATGAAG TGAAATCTAT
481 GGTTAAGAGG CTCAATTCCT CTGCCATAGC TGAAAAATCT GTGGATATGA AGTCTATGTT
541 TTTTGAGCTG ATGCTCAATG TTATGATGAG GACAATTGCT GGAAAAAGAT ATTACGGTGA
601 GAATGTGGAG GACATTGAGG AAGCTACGAG ATTCAAAGGT TTGGTGCAAG AGACTTTCAG
661 GATTGGCGGG GCGACGAATA TTGGCGACTT TTGCGGCGG TGAAGTTAT TGGTGAGGAA
721 ATTGGAGAAA AGTTTAATTG TGTTGCAAGA GAACAGAGAT GAGTTTATGC AGGAATTAAT
781 TAAAGATTGC AGAAAAAGAA TGGAGAAAGA AGGTACTGTT ACTGATTCAG AAATTGAAGG
841 GAACAAGAAA TGTTTAATTG AAGTTTTGTT AACACTACAA GAAAATGAAC CGGAATACTA
901 CAAAGATGAA ATCATCAGAA GCCTTATGCT TGTTCTATTA TCAGCTGGTA CAGATACTTC
961 AGTTGGGACA ATGGAATGGG CTTTATCATT AATGTTAAAC CACCCTGAAA CTCTGAAGAA
1021 AGCACAAGCT GAAATTGATG AACATATAGG ACATGAACGT TTAGTGGACG AGCTCGACAT
1081 CAACAACCTA CCTTACCTAC GTTGATAAAT CAACGAGACA TTCCGAATGT ACCCTGCAGG
1141 ACCACTACTA GTCCACACG AGTCGTCAGA GGAACCACC GTAGGAGGCT ACCGTGTACC
1201 CGGAGGAACC ATGTTACTTG TGAATTTGTG GGCTATTCAC AATGATCCAA AGCTATGGGA
1261 TGAACCAAGA AAGTTTAAGC CAGAAAGATT TGAAGGACTA GAAGGTGTTA GAGACGGTTA
1321 CAAAATGATG CTTTTTGGTT CTGGACGAAG GAGTTGTCCT GGAGAAGGAT TGGCTATTCTG
1381 AATGGTTGCA TTGTCATTGG GATGTATTAT TCAATGCTTT GATTGGCAAC GACTTGGGGA
1441 AGGATTGGTT GATAAGACTG AAGGAACTGG ACTTACTTTG CCTAAAGCTC AACCTTTAGT
1501 GGCCAAGTGT AGCCACGAC CTATAATGGC TAATCTTCTT TCTCAGATTT GAACATAATT
1561 GGTTCCTACC AAACATCCCC AAACCTAGAA ATTATTATTG GTTACATATA CAATGTAATC
1621 AATTTTGAAC CATATTATAT CTCAATGTAT TCCTTTTAA AAAAAAAAAA AAAAA

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SEQ. ID. NO. 168

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1 MVNMFPIIY APLLLAFYII TKHFLRLRN NPPAPFLTFP FIGHLYLFKK PLQRTLAKIS
61 ERYGSVLLLE FGSRKVLLVS SPSAAEECLT KNDIIFANRP LLMAGKHLGY NFTSLAWSSY
121 GDHWRNLRR I TSVEMFSTHR LQMLHGIRID EVKSMVKRLN SSAIAEKSVD MKSMFFELML
181 NVMMRTIAGK RYYGENVEDI EEATRFKGLV QETFRIGGAT NIGDFLPALK LLVRKLEKSL
241 IVLQENRDEF MQELIKDCRK RMEKEGTVTD SEIEGNKKCL IEVLLTLQEN EPEYYKDEII
301 RSLMLVLLSA GTDTSVG TME WALSLMLNHP ETLKKAQAEI DEHIGHERLV DESDINNLPY
361 LRCIINETFR MYPAGPLLVP HESSEETTVG GYRVPGGTML LVNLWAIHND PKLWDEPRKF
421 KPERFEGLEG VRDGYKMMPF GSGRRSCPGE GLAIRMVALS LGCIIQCFDW QRLGEGLVDK
481 TEGTGLTLPK AQPIVAKCSP RPIMANLLSQ I

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FIG. 85

NAME D104A-AE8 (69,1755)  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 169

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1 CAACACGCTT ACTATCTCCT AAATCTCCAC TCAAAAACAA AGAAGAGAAA GATTTAAAAC
61 TAATAATTAT GAAAGAGATG GTGCAAAACA ATATGAGCAC TTCTCTTCTT GAAACTTTAC
121 AAGCTACGCC CATGATATTC TACTTCATCG TCCCTCTCTT CTGCTTATTC CTTCTCTCCA
181 AATCTCGCCG TAAACGTTTG CCTCCAGGTC CAACTGGCTG GCCTCTCATT GGTAACATGA
241 TGATGATGGA CCAGTTAACT CACCGTGGCC TTGCCAAACT AGCCCCAAAA TATGGTGGTG
301 TTTTTCACCT TAAAATGGGT TATGTTTACA AAATTGTAGT CTCTGGTCCA GACGAAGCTC
361 GCCAAGTATT ACAGGAACAC GACATCATAT TTTCGAACCG TCCAGCGACC GTAGCCATAA
421 GTTACCTAAC ATATGACAGG GCAGACATGG CTTTGTGCTGA CTATGGACTC TTCTGGCGGC
481 AGATGAGAAA ACTATGTGTA ATGAAACTCT TCAGCCGCAA ACGAGCTGAG TCATGGGACT
541 CAGTTCGAGA CGAAGCGGAT TCCATGGTTA GAATTGTAAC AACCAACACA GGCACAGCTG
601 TTAAGTTAGG TGAAGTGTG TTCAGTCTCA CTCGTAATAT TATCTACAGA GCTGCTTTTG
661 GAACTTGTTT TGAAGATGGA CAAGCGAGT TCATTAAAAAT TATGCAAGAG TTTTCGAAGC
721 TATTTGGTGC TTTCAATATA GCTGATTTTA TTCCATGGCT AGGGTGGGTT GGTAAGCAGA
781 GTCTAAATAT TAGACTTGCT AAGGCTAGAG CGTCGCTTGA TGGGTTCATT GATTCGATTA
841 TTGATGACCA TATTATTAGA AAGAAAGCTT ATGTTAATGG CAAAAATGAT GGAGGTGATC
901 GAGAAACTGA TATGGTGGAT GAGCTTTTAG CTTTTTACAG TGAGGAAGCA AAAGTAACTG
961 AGTCCGAAGA TTTGCAGAAT GCTATCAGAC TTAATAAGGA TAATATCAAA GGCATCATCA
1021 TGGATGTAAT GTTTGGAGGG ACAGAAACAG TGGCTTCTGC AATAGAATGG GCCATGGCAG
1081 AGCTTATGAG GAGTCCTGAA CAAGTTAAAA AGGTACAACA AGAGCTGGCT AACGTTGTTG
1141 GACTCAACAG AAAAGTTGAA GAATCTGACT TTGAAAAATT AACATACTTA AGATGTTGTC
1201 TAAAAGAAAC TCTACGACTT CACCCTCCAA TCCCTCTCCT CCTCCATGAG ACCGCCGAGG
1261 AATCCACCGT CTCCGGCTAC CATATTCCGG CAAAGTCACA TGTTATTATA AATTCATTTG
1321 CCATTGGGCG TGACAAAAAT TCATGGGAAG ATCCTGAAAC TTATAAACCA TCTAGGTTTC
1381 TCAAGAAGG TGTACCAGAT TTTAAAGGAG GTAATTTTGA GTTTATACCA TTTGGGTCGG
1441 GTCGGCGGTC TTGCCCCGGT ATGCAACTTG GGCTTTATGC ATTGGAAATG GCTGTGGCCC
1501 ATCTTCTTCA TTGTTTTACT TGGGAATTGC CAGATGGTAT GAAACCAAGT GAGCTTAAAA
1561 TGGATGATAT TTTTGGACTC ACTGCTCCAA GAGCTAATCG ACTCGTGGCT GTGCCTACTC
1621 CACGTTTGTT GTGTCCCCTT TATTAATTGA AGAAAAAGG TGGGGCTTTT ACTTGCATCA
1681 AAGAGTGGTG CTTGTGATTT TTCCACCTTT TGGTTAAATA TACGAATTAT TATGATATAC
1741 GAATTCTTGG GCACA

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SEQ. ID. NO. 170

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1 MKEMVQNNMS TSLLETLOAT PMIFYFIVPL FCLFLLSKSR RKRLPPGPTG WPLIGNMMMM
61 DQLTHRGLAK LAQKYGGVFH LKMGYVHKIV VSGPDEARQV LQEHDIIFSN RPAITVAISYL
121 TYDRADMAFA DYGLEWRQMR KLCVMKLFSS KRAESWDSVR DEADSMVRIV TTNTGTAVNL
181 GELVFSLTRN IYRAAFGTC SEDGQGEFIK IMQEFKSLFG AFNIADFIPW LGWVGKQSLN
241 IRLAKARASL DGFIDSIIDD HIIRKKAYVN GKNDGGDRET DMVDELLAFY SEEAKVTESE
301 DLQNAIRLTK DNIKAIIMDV MFGGTETVAS AIEWAMAEIM RSPEDLKKVQ QELANVVGLN
361 RKVEESDFEK LTYLRCCLEKE TLRHPPPIPL LLHETAEEST VSGYHIPAKS HVIINSFAIG
421 RDKNWEDPE TYKPSRFLKE GVPDFKGGNF EFIPFGSGRR SCPGMQLGLY ALEMAVAHLL
481 HCFTWELPDG MKPSELKMDD IFGLTAPRAN RLVAVPTPRL LCPLY

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FIG. 86

NAME D105-AD6  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 171

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1 TGTGCTTGTG AGTGTGGGAG AAGGCCTTCA ATATGGAGAT ACCATATTAC AGCTTAAAAA
61 TTGCAATTTC TTCATTTGCA ATTATCTTTG TACTAAGATG GGCATGGAAA ATCTTGAATT
121 ATGTGTGGTT AAAACCAAAA GAATTGGAGA AATACCTCAG ACAGCAGGGT TTCAAAGGAA
181 ACTCTTACAA ATTCTTGTTT GGGGATATGA AAGAGATGAA GAAAATGGGT GAAGAAGCTA
241 TGTCTAAGCC AATCAATTTT TCTCATGACA TGATTTGGCC TAGAGTTATG CCATTCATCC
301 ACAAACCAT CACCAATTAT GGTAAGAATT GTATTGTGTG GTTTGGGCCA AGACCAGCAG
361 TCCTGATCAC AGACCCGGAA CTGTAAAGG AGGTGCTAAC GAAGAATTTT GTCTATCAGA
421 AGCCGCTTGG CAATCCACTC ACAAAGTTGG CAGCAACTGG AATTGCAGGC TATGAAACAG
481 ATAAATGGGC TACACATAGA AGGCTTCTCA ATCCTGCTTT TCACCTTGAC AAGTTGAAGC
541 ATATGCTACC TGCATTCCAA TTTACTGCTA GTGAGATGTT GAGCAAATTG GAGAAAGTTG
601 TTTCAACAAA CGGAACAGAG ATAGATGTGT GGCCATATTT ACAAACCTTG ACAAGTGATG
661 CCATTTCAAG AACTGCGTTT GGAAGTAGTT ATGAAGAAGG AAGAAAGATT TTTGACCTTC
721 AAAAGAACA ACTTTCACTA ATTCTAGAAG TTTACGCAC AATATATATT CCAGGATGGA
781 GGTTTTTGCC AACGAAAAGG AACAAAAGGA TGAAGCAAAT ATTTAATGAA GTACGAGCAC
841 TGGTATTTGG AATTATTAAG AAAAGGATGA GTATGATTGA AAAATGGAGAA GCACCTGATG
901 ATTTATTGGG AATATTATTG GCATCCAATT TAAAAGAAAT CCAACAACAT GGAAACAACA
961 AGAAATTTGG TATGAGTATT GATGAGGTGA TTGAAGAGTG TAAACTCTTC TATTTTGCTG
1021 GGCAAGAGAC TACTTCATCT TTAGTTGTAT GGACTATGAT TTTGTTGTGC AAATATCCTA
1081 ATTGGCAAGA TAAAGCTAGA GAAGAGGTTT TGCAAGTGTT TGGGAGTAGG GAAGTTGACT
1141 ATGACAAGTT GAATCAGCTA AAAATAGTAA CTATGATCTT AAACGAGGTC TTAAGGTTGT
1201 ATCCAGCAGG ATATGTGATT AATCGAATGG TAAACAAAGA AACAAAGTTA GGGAAATTTGT
1261 GTTTACCAGC CGGCGTACAG CTCGTGTTAC CAACAATGTT GTTGCAACAT GATACTGAAA
1321 TATGGGGAGA TGATGCAATG GAGTTCAATC CAGAGAGATT TAGTGATGGA ATATCCAAAG
1381 CAACAAAAGG AAAACTTGTG TTTTTTCCAT TTAGTTGGGG TCCAAGAATA TGTATTGGGC
1441 AAAATTTTGC TATGTTAGAG GCTAAAATGG CAATGGCTAT GATTCTGAAA ACCTATGCAT
1501 TTGAACCTC TCCATCTTAT GCTCATGCTC CTCATCCACT ACTACTTCAA CCTCAATATG
1561 GTGCTCAATT AATTTTGTAC AAGTTGTAGA TATGGTCAAT TTGGAACCTG TTATGGAAC
1621 TTTATCATTT TAATCAACCA TATTGAGGGA ACATGGTTTG AGGTTAAATC CTCGTGTGTG
1681 TGTC

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SEQ. ID. NO. 172

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1 MEIPYYSLKI AISSFALIFV LRWAWKILNY VWLKPKELEK YLRQQGFKGN SYKFLFGDMK
61 EMKKMGEEAM SKPINFSHDM IWPRVMPFIH KTITNYGKNC IVWFGPRPAV LITDPELVKE
121 VLTKNFVYQK PLGNPLTKLA ATGIAGYETD KWATHRRLN PAFHLDKLLH MLPAFQFTAS
181 EMLSKLEKVV SPNGTEIDVW PYLQTLTSDA ISRTAFGSSY EEGRKIFDLQ KEQLSLILEV
241 SRTIYIPGWR FLPTKRNRKM KQIFNEVRAL VFGIIKKRMS MIENGEAPDD LLGILLASNL
301 KEIQQHGNK KFGMSIDEVI EECKLFYFAG QETTSSLLVW TMILLCKYPN WQDKAREEVL
361 QVFGSREVDY DKLNQLKIVT MILNEVLRLY PAGYVINRMV NKETKLGKLC LPAGVQLVLP
421 TMLLQHDTEI WGDDAMEFNP ERFSDGSKA TKGKLVFFPF SWGPRICIGQ NFAMLEAKMA
481 MAMILKTYAF ELSPSYAHAP HPLLLQPOYG AQLILYKL

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FIG. 87

28/111

NAME D109-AH8 (14,1697)  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 173

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1 CCAGCACCAA GACATGGAGA ATTCCTGGGT AGTTTTAGCC TTAACAGGCC TTCTTACATT
61 AGTTTTTCTC TCAAAGTTTC TTCATAGTCC TCGTCGTAAA CAAAATCTTC CACCAGGTCC
121 AAAACCATGG CCTATTGTTG GCAATATACA TCTTCTTGGT TCCACCCCTC ACAGATCCCT
181 TCACGAAGTT GCAAAAAGAT ACGGAGATTT AATGCTACTA AAGTTCGGTT CGCGCAATGT
241 CCTTATTTTA TCCTCCCCAG ATATGGCTAG AGAATTCTTG AAAACAAATG ATGCCATTTG
301 GGCTTCTCGC CCTGAGCTTG CCGCTGGTAA ATATACTGCT TATAATTATT GCGACATGAC
361 ATGGGCACGT TATGGACCCT TTTGGAGACA AGCAAGGAGG ATCTATCTCA ACGAGATTTT
421 CAATCCTAAA CGTTTGGATT CATTTGAGTA CATTCGCATA GAGGAAAGGC ATAATTTGAT
481 TTCACGTCTT TTTGTTCTCT CTGGGAAGCC AATTCTTCTT AGAGACCATT TAACTCGGTA
541 CACTCTTACA AGTATAAGTA GAACAGTATT GAGTGGAAAA TATTTTAGCG AGTCACCTGG
601 CCAAATTCA ATGATAACTT TGAAACAATT GCAGGATATG CTTGATAAGT GGTTTTGTCT
661 TAATGGTGTG ATCAATATTG GGGACTGGAT ACCTTGGCTT GCTTTCTTGG ATTTGCAGGG
721 TTATGTCAAG CAAATGAAGG AGTTGCATAG GAACTTCGAC AAATTTTATA ACTTTGTGCT
781 AGATGATCAC AAGGCTAATA GGGGAGAGAA GAACTTTGTG CCAAGAGACA TGGTCGATGT
841 TTTGCTGCAG CAAGCTGAGG ATCCTAATCT TGAGGTCAA CTCACCAATG ATGTGTGCAA
901 GGGTCTAATG CAGGACTTAT TGGCTGGCGG CACGGACACC TCAGCAACAA CCGTTGAATG
961 GGCTTTTTAT GAACTTCTTA GACAACCTAA GATTATGAAG AAAGCACAA CAGAGCTAGA
1021 CCTTGTCATT TCACAGGACA GATGGGTTCA AGAAAAAGAT TACACTCAAC TCCCTTACAT
1081 TGAGTCAATC ATCAAGGAAA CATTGAGGCT TCACCCAGTA AGCACCATGC TTCCACCGCG
1141 CATTGCCTTG GAGGATTGTC ATGTAGCAGG CTATGACATA CCTAAAGGTA CAATTTTAAT
1201 TGTGAACACT TGGAGTATTG GAAGAAATTC ACAGCATTGG GAGTCACCAG AAGAATTCCT
1261 TCCGGAGAGG TTTGAAGGGA AGAATATTGG TGTCACAGGA CAACATTTTG CGCTCTTGCC
1321 ATTTGGCGCG GGCCGGAGAA AGTGCCCGAG ATACAGTCTT GGGATTCTGA TAATTAGGGC
1381 AACTTTAGCT AACTTGTTGC ATGGATTCAA CTGGAGATTG CCTAATGGTA TGAGTCCAGA
1441 AGACATTAGC ATGGAAGAGA TTTATGGGCT AATTACACAC CCCAAAGTCG CACTTGACGT
1501 GATGATGGAG CCTCGACTTC CCAACCATCT TTACAAATAG TGGATAATTA AAACCATTAA
1561 AATCGTTTTG TTATATGCAT GTCTCATATT TGTAGTGGTC AAAATGTTTG TTTTCTATCA
1621 TGGATGTTCA GTGCGAGGTT GGAATTTCA AGTCATTAC GTGTGAAAT ATTTTAAATT
1681 TAAAAAAA AAAAAA

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SEQ. ID. NO. 174

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1 MENSWVVLAL TGLLTLVFLS KFLHSPRRKQ NLPPGPKPWP IVGNIHLLGS TPHRSLHELA
61 KRYGDLMLLK FGSRNVLILS SPDMAREFLK TNDAIWASRP ELAAGKYTAY NYCDMTWARY
121 GPFWRQARRI YLNEIFNPKR LDSFEYIRIE ERHNLISRLF VLSGKPILLR DHLTRYTLTS
181 ISRTVLSGKY FSESPGQNSM ITLKQLQDML DKWFLNGVI NIGDWIPWLA FLDLQGYVKQ
241 MKELHRNFDK FHNFLDDHK ANRGEKNFVP RDMVDVLLQQ AEDPNLEVKL TNDVCVKGLMQ
301 DLLAGGTDTS ATTVEWAFYE LLRQPKIMKK AQQELDLVIS QDRWVQEKDY TQLPYIESII
361 KETLRLHPVS TMLPPRIALE DCHVAGYDIP KGTILIVNTW SIGRNSQHWE SPEEFLPERF
421 EGKNIGVTGQ HFALLPFGAG RRKCPGYSLG IRIIRATLAN LLHGFNWRLP NGMSPEDISM
481 EEIYGLITHP KVALDVMMEP RLPNHLYK

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FIG. 88

NAME D110-AF12 (166,1631)  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 175

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1 ACTGTTCAAA TCACAGTAAC AGCATCTTGT GCTGCCATAA TAATTACTCT AGTGGTGTGT
61 ATATGGAGAG TGCTGAATTG GGTTCGTTTC AGACCAAAGA AGCTGGAAAA GCTACTGAGG
121 AAACAAGGTC TCAAAGGCAA TTCCTACAGG ATTTTGTATG GGGATATGAA GGAGCTTTCT
181 GGTATGATTA AGGAAGCTAA CTCCAAACCC ATGAATCTTT CTGATGATAT TGCCCCAAGA
241 TTGGTCCCTT TCTTCTTGA TACCATCAAG AAATATGGGA AAAAATCCTT TGTATGGTTG
301 GGTCCAAAAC CGCTGGTTTT TGTCATGGAC CCCGAGCTTA TAAAGGAAGT ATTCTCCAAA
361 AACTATCTGT ATCAAAGGCC TCATTCAAAT CCATTAACCA AGTTACTGGC ACAAGGACTT
421 GTAAGCCAAG AGGAAGACAA ATGGGCCAAA CATAGAAAAA TCGTCACTCC TGCCTTCCAC
481 CTGGAGAAGC TAAAGCATAT GCTTCCAGCT TTTTGTTTGA GCTGTACTGA GATGCTGAGC
541 AAATGGGAAG ACATTGTTGC AGTTGAGGGC TCACATGAGA TAGATATATG GCCTGGCCTT
601 CAACAATTAA CTAGTGATGT GATCTCTCGG ACAGCCTTTG GCAGTAGCTA TGAAGCAGGT
661 AGAAGGATAT TTGAACTTCA AAAGGAACAA GCTCAATTC TTATGGAAGC TATACGCTCC
721 GTTTATATTC CAGGCTGGAG GTTTTTGCCA ACAAAGAGGA ACAGAAGAAT GAAGGAAAT
781 GAAAAGGATG TTCAAGCCTT AGTTAGAGGT ATTATGATA AAAGAGTAAA GTCAATGAAA
841 GCAGGAGAGG TGAATAATGA GGATCTGCTT GGTATATTGC TGGAATCTAA TTTTAAAGAA
901 ATTGAACAGC ATGGAAACAA GGATTTTGGG ATGAGCATTG AAGAAGTCAT TCAAGAATGC
961 AAGTTATTCT ATTTTGCTGG CCAAGAAACT ACATCAGTGT TGCTTGTATG GACTCTAATA
1021 TTGCTGAGCA GGCATCAGGA TTGGCAAGCA CTGGCCAGAG AAGAGGTGTT GCAAGTCTTT
1081 GGGAAATCAGA AACCAGATTT TGATGGATTA AATCGTCTAA AAATTGTTAC AATGATCTTG
1141 TACGAGTCTT TAAGGCTCTA TCCCCAGTA GTGACACTTA CCCGAAGGCC TAAGGAAGAC
1201 ACTGTATTAG GAGATGTATC TCTACCAGCA GGTGTGTTAA TCTCCTTACC AGTGATCTTA
1261 TTGCATCACG ACGAAGAGAT ATGGGGTAAA GATGCAAAGA AGTTCAAGCC AGAGAGATTC
1321 AGAGATGGAG TCTCAAGTGC AACAAAGGGT CAAGTCACTT TTTTCCATT TACTTGGGGT
1381 CCCAGAATAT GCATTGGACA AAATTTTGGC ATGTTAGAAG CAAAGACTAC TTTGGCTATG
1441 ATCCTACAAC GCTTCTCCTT TGAAGTGTCT CCATCTTATG CACATGCTCC TCAGTCCATA
1501 ATAACTTTGC AACCCAGTA TGGTGCTCCA CTTATTTTGC ATAAAATATA GTTTATTACT
1561 TGTAAGTAGT GTCTCGTTTT ATGTTAAGCA TGAGTCCAAA ATGTTAAGGC TTGTAGAACT
1621 GCAAATGGG A

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SEQ. ID. NO. 176

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1 MKELSGMIKE ANSKPMNLSD DIAPRLVFFF LDTIKKYGKK SFVWLGPKEP VFVMDPELIK
61 EVFSKNLYLQ KPHSNPLTKL LAQGLVSQEE DKWAKHRKIV TPAFHLEKLK HMLPAFCLSC
121 TEMLSKWEDI VAVEGSHEID IWPGLQQLTS DVISRTAFGS SYEAGRRIE LQKEQAQFLM
181 EAIRSVYIPG WRFLPTKRNR RMKEIEKDVQ ALVRGIIDKR VKSMKAGEVN NEDLLGILLE
241 SNFKEIEQHG NKDFGMSIEE VIQECKLFYF AGQETTSVLL VWTLLLSRH QDWQALAREE
301 VLQVFGNQKP DFDGLNRLKI VTMIYESLR LYPPVVTLTR RPKEDTVLGD VSLPAGVLIS
361 LPVILLHHDE EIWGKDAKKF KPERFRDGVS SATKGQVTFE PFTWGPRICI GQNFAMLEAK
421 TTLAMILQRF SFELSPSYAH APQSIITLQP QYGAPLILHK I

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FIG. 89

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NAME D112-AA5  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 177

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1  ATTTATCTCT  GAAAATGCAA  TTCTTCAGCT  TGGTTTCCAT  TTTCCTATTC  CTATCTTTCC
61  TATTTTTGTT  GAGGAAATGG  AAGAACTCCA  ATAGCCAAAG  CAAAAAATTG  CCACCAGGTC
121  CATGGAAAAAT  ACCAATACTA  GGAAGTATGC  TTCATATGAT  TGGTGGAGAA  CCGCACCATG
181  TCCTTAGAGA  TTTAGCCAAA  AAAGATGGAC  CACTTATGCA  CCTTCAGTTA  GGTGAAATTT
241  CTGCAGTTGT  GGTACTTCT  AGGGACATGG  CAAAAGAAAGT  GCTAAAAACT  CATGACGTCG
301  TTTTTCATC  TAGGCCTAAA  ATTGTAGCCA  TGGACATTAT  CTGTTATAAC  CAGTCCGACA
361  TTGCCTTTAG  CCCTTATGGC  GACCACTGGA  GACAAATGCG  TAAAATTTGT  GTCATGGAAC
421  TTCTCAATGC  AAAGAATGTT  CGGTCTTTCA  GCTCCATCAG  ACGTGATGAA  GTCGTTTCGT
481  TCATTGACT  TATCCGGTCA  GATTCTTCTT  CAGGTGAGCT  AGTTAATTTT  ACGCAGAGGA
541  TCATTTGGTT  TGCAAGCTCC  ATGACGTGTA  GATCAGCATT  TGGGCAAGTA  CTCAAGGGGC
601  AAGACATATT  TGCCAAAAG  ATCAGAGAAG  TAATAGGATT  AGCAGAAGGC  TTTGATGTGG
661  TAGACATCTT  CCCTACATAC  AAGTTTCTTC  ATGTTCTCAG  TGGGATGAAG  CGTAAACTTT
721  TGAATGCCCA  CCTTAAGGTA  GACGCCATTG  TTGAGGATGT  CATCAACGAG  CACAAGAAAA
781  ATCTTGCA  TGGCAAGAGT  AATGGCGCAT  TAGGAGGCGA  AGATCTAATT  GATGTCCTAC
841  TGAGACTTAT  GAATGACACA  AGTCTTCAAT  TTCCCATCAC  CAACGACAAT  ATCAAAGCTG
901  TTGTTGTTGA  CATGTTTGCT  GCCGGAACAG  AAACCTTCATC  AACAACAAC  GTATGGGCGA
961  TGGCTGAAAT  GATGAAGAAT  CCAAGTGTAT  TCGCCAAAGC  TCAAGCAGAA  GTGCGAGAAG
1021  CCTTTAGGGA  CAAAGTATCT  TTTGATGAAA  ATGATGTGGA  GGAGCTGAAA  TACTTAAAGT
1081  TAGTCATTAA  AGAACTTTG  AGACTTCATC  CACCGTCTCC  ACTTTTGGTC  CCAAGAGAAT
1141  GCAGGGAAGA  TACGGATATA  AACGGCTACA  CTATTCCTGC  AAAGACCAA  GTTATGGTTA
1201  ATGTTTGGGC  ATTGGGAAGA  GATCCAAAT  ATTGGGATGA  CGCGGAAAGC  TTTAAGCCAG
1261  AGAGATTGA  GCAATGTTCT  GTAGATATTT  TTGGTAATAA  TTTTGAGTTT  CTTCCCTTTG
1321  GCGGGGGACG  GAGAATTTGT  CCTGGAATGT  CATTTGGTTT  AGCTAATCTT  TACTTACCAT
1381  TGGCTCAATT  ACTCTATCAC  TTTGACTGGA  AACTCCCAAC  CGGAATCAAG  CCAAGAGACT
1441  TGGACTTGAC  CGAATTATCG  GGAATAACTA  TTGCTAGAAA  GGGTGACCTT  TACTTAAATG
1501  CTAATCCTTA  TCAACCTTCT  CGAGAGTAAT  TTACTATTGG  CATAACATT  TTAAATTTCC
1561  TTCATCAACC  TC

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SEQ. ID. NO. 178

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1  MQFFSLVSIF  LFLSFLFLLR  KWKNSNSQSK  KLPPGPWKIP  ILGSMLHMIG  GEPHHVLRDL
61  AKKDGPLMHL  QLGEISAVVV  TSRDMAKEVL  KTHDVVFASR  PKIVAMDIIC  YNQSDIAFSP
121  YGDHWRQMRK  ICMELLNAK  NVRSFSSIRR  DEVVRLIDSI  RSDSSSGELV  NFTQRIWFA
181  SSMTCRSAFG  QVLKGQDIFA  KKIREVIGIA  EGFVDVDFP  TYKFLHVLSG  MKRKLNAHL
241  KVDAIVEDVI  NEHKKNLAA  KSNALGGED  LIDVLLRLMN  DTSLQFPITN  DNIKAVVDM
301  FAAGTETSST  TTVWAMAEM  KNPSVFKAQ  AEFREAFRDK  VSFENDVEE  LKYLKLVKE
361  TLRHPPSP  LVPRECREDT  DINGYTIPAK  TKVMNVWAL  GRDPKYWDDA  ESFKPERFEQ
421  CSVDIFGNF  EFLPFGGRR  ICPGMSFGLA  NLYLPLAQLL  YHFDWKLPTG  IKPRDLDLTE
481  LSGITIARKG  DLYLNATPYQ  PSRE

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FIG. 90

31/111

NAME D120-AH4  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 179

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1 ATAATGCTTT CTCCCATAGA AGCCATTGTA GGACTAGTAA CCTTCACATT TCTCTTCTTC
61 TTCCTATGGA CAAAAAATC TCAAAAACCT TCAAAACCCT TACCACCGAA AATCCCCGGA
121 GGATGGCCGG TAATCGGCCA TCTTTTCCAC TTCAATGACG ACGGCGACGA CCGTCCATTA
181 GCTCGAAAAC TCGGAGACTT AGCTGACAAA TACGGCCCCG TTTTCACTTT TCGGCTAGGC
241 CTTCCCCTTG TCTTAGTTGT AAGCAGTTAC GAAGCTGTAA AAGACTGTTT CTCTACAAAT
301 GACGCCATTT TTTCCAATCG TCCAGCTTTT CTTTACGGCG ATTACCTTGG CTACAATAAT
361 GCCATGCTAT TTTTGGCCAA TTACGGACCT TACTGGCGAA AAAATCGAAA ATTAGTTATT
421 CAGGAAGTTC TCTCCGCTAG TCGTCTCGAA AAATTCAAAC ACGTGAGATT TGCAAGAATT
481 CAAGCGAGCA TTAAGAATTT ATATACTCGA ATTGATGGAA ATTCGAGTAC GATAAATTTA
541 ACTGATTGGT TAGAAGAATT GAATTTTGGT CTGATCGTGA AGATGATCGC TGGAAAAAAT
601 TATGAATCCG GTAAAGGAGA TGAACAAGTG GAGAGATTTA AGAAAGCGTT TAAGGATTTT
661 ATGATTTTAT CAATGGAGTT TGTGTTATGG GATGCATTTT CAATTCCATT ATTTAAATGG
721 GTGGATTTTC AAGGGCATGT TAAGGCTATG AAAAGGACTT TTAAAGATAT AGATTCTGTT
781 TTTCAGAATT GGTTAGGGGA ACATATTAAT AAAAGAGAAA AAATGGAGGT TAATGCAGAA
841 GGAATGAAC AAGATTTTCA TGATGTGGTG CTTTCAAAAA TGAGTAATGA ATATCTTGGT
901 GAAGGTTACT CTCGTGATAC TGTCAATAAA GCAACGGTGT TTAGTTTGGT CTTGGATGCA
961 GCAGACACAG TTGCTCTTCA CATAAATTGG GGAATGGCAT TATTGATAAA CAATCAAAAG
1021 GCCTTGACGA AAGCACAAGA AGAGATAGAC ACAAAGTTG GTAAGGACAG ATGGGTAGAA
1081 GAGAGTGATA TTAAGGATTT GGTATACCTC CAAGCTATTG TTAAAGAAGT GTTACGATTA
1141 TATCCACCAG GACCTTTGTT AGTACCACAC GAAAATGTAG AAGATTGTGT TGTTAGTGGA
1201 TATCACATTC CTAAAGGGAC AAGATTATTC GCAAACGTCA TGAAACTGCT ACGTGATCCT
1261 AAACCTCTGGC CTGATCCTGA TACTTTCGAT CCAGAGAGAT TCATTGCTAC TGATATTGAC
1321 TTTCGTGGTC AGTACTATAA GTATATCCCG TTTGGTTCTG GAAGACGATC TTGTCCAGGG
1381 ATGACTTATG CATTGCAAGT GGAACACTTA ACAATGGCAC ATTTGATCCA AGGTTTCAAT
1441 TACAGAACTC CAAATGACGA GCCCTTGGAT ATGAAGGAAG GTGCAGGCAT AACTATACGT
1501 AAGGTAAATC CTGTGGAAC GATAATAGCG CCTCGCCTGG CACCTGAGCT TTATTTAAAC
1561 CTAAGATCTT TCATCTTGGT TGATCATTGT ATAATACTCC TAAATGGATA TTCATTTACC
1621 TTTTATCAAT TAA

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SEQ. ID. NO. 180

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1 MLSPIEAIVG LVTFTFLFFF LWTKKSQKPS KPLPPKIPGG WPVIGHLFHF NDDGDDRPLA
61 RKLGLDADKY GPVFTFRLGL PLVLVVSSYE AVKDCFSTND AIFSNRPAFL YGDYLGYNNA
121 MLFLANYGPY WRKNRKLVIQ EVLSASRLEK FKHVRFARIQ ASIKNLYTRI DGNSSTINLT
181 DWLEELNFGL IVKMIAGKNY ESGKGDEQVE RFKKAfkDEM ILSMEFVLWD AFPIPLFKWV
241 DFQGHVKAMK RTFKDIDSFV QNWLGEHINK REKMEVNAEG NEQDFIDVVL SKMSNEYLGE
301 GYSRDTVIKA TVFSILVDAA DTVALHINWG MALLINNQKA LTKAQEEIDT KVGKDRWVEE
361 SDIKDLVYLO AIVKEVLRLY PPGPLLVPHE NVEDCVVSGY HIPKGTRLFA NVMKLLRDPK
421 LWPDPDTFDP ERFIATDIDF RGQYYKYIPF GSGRRSCPGM TYALQVEHLT MAHLIQGFNY
481 RTPNDEPLDM KEGAGITIRK VNPVELIIAP RLAPELY

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FIG. 91

NAME D121-AA8  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 181

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1 AATCCATAAT GCTTTCTCCC ATAGAAGCCA TTGTAGGACT AGTAACCTTC ACATTTCTCT
61 TCTTCTTCCT ATGGACAAAA AAATCTCAAA AACCTTCAAA ACCCTTACCA CCGAAAATCC
121 CCGGAGGATG GCCGGTAATC GGCCATCTTT TCCACTTCAA TGACGACGGC GACGACCGTC
181 CATTAGCTCG AAAACTCGGA GACTTAGCTG ACAAATACGG CCCCCTTTTC ACTTTTCGGC
241 TAGGCCTTCC CCTTGCTTA GTTGTAAAGCA GTTACGAAGC TGTAAGAGAC TGTTTCTCTA
301 CAAATGACGC CATTTTTTCC AATCGTCCAG CTTTTCTTTA CGGCGATTAC CTTGGCTACA
361 ATAATGCCAT GCTATTTTTG GCCAATTACG GACCTTACTG GCGAAAAAAT CGAAAATTAG
421 TTATTAGGA AGTTCTCTCC GCTAGTCGTC TCGAAAAAT CAAACACGTG AGATTTGCAA
481 GAATTCAAGC GAGCATTAAG AATTTATATA CTCGAATTGA TGGAAATTCG AGTACGATAA
541 ATTTAACTGA TTGGTTAGAA GAATTGAATT TTGGTCTGAT CGTGAAGATG ATCGCTGGAA
601 AAAATTATGA ATCCGGTAAA GGAGATGAAC AAGTGGAGAG ATTTAAGAAA GCGTTTAAGG
661 ATTTTATGAT TTTATCAATG GAGTTTGTGT TATGGGATGC ATTTCCAATT CCATTATTTA
721 AATGGGTGGA TTTTCAAGGG CATGTTAAGG CTATGAAAAG GACTTTTAAA GATATAGATT
781 CTGTTTTTCA GAATTGGTTA GAGGAACATA TTAATAAAAG AGAAAAAATG GAGGTTAATG
841 CAGAAGGGAA TGAACAAGAT TTCATTGATG TGGTGCTTTC AAAAATGAGT AATGAATATC
901 TTGGTGAAGG TTAATCTCGT GATACTGTCA TTAAGCAAC GGTGTTTAGT TTGGTCTTGG
961 ATGCAGCAGA CACAGTTGCT CTTACATAA ATTGGGGAAT GGCATTATTG ATAAACAATC
1021 AAAAGGCCTT GACGAAAGCA CAAGAAGAGA TAGACACAAA AGTTGGTAAG GACAGATGGG
1081 TAGAAGAGAG TGATATTAAG GATTTGGTAT ACCTCCAAGC TATTGTTAAA GAAGTGTAC
1141 GATTATATCC ACCAGGACCT TTGTTAGTAC CACACGAAAA TGTAGAAGAT TGTGTTGTTA
1201 GTGGATATCA CATTCCTAAA GGGACAAGAT TATTCGCAAA CGTCATGAAA CTGCAACGTG
1261 ATCCTAAACT CTGGTCTGAT CCTGATACTT TCGATCCAGA GAGATTCATT GCTACTGATA
1321 TTGACTTTTCG TGGTCAGTAC TATAAGTATA TCCCGTTTGG TTCTGGAAGA CGATCTTGTC
1381 CAGGGATGAC TTATGCATTG CAAGTGAAC ACTTAACAAT GGCACATTG ATCCAAGGTT
1441 TCAATTACAG AACTCCAAAT GACGAGCCCT TGGATATGAA GGAAGGTGCA GGCATAACTA
1501 TACGTAAGGT AAATCCTGTG GAACTGATAA TAGCGCCTCG CCTGGCACCT GAGCTTTATT
1561 AAAACCTAAG ATCATCTTGC TTGAT

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SEQ. ID. NO. 182

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1 MLSPIEIVG LVTFTFLFFF LWTKKSQKPS KPLPPKIPGG WPVIGHLFHF NDDGDDRPLA
61 RKLGLADKY GPVFTFRLGL PLVLVVSSYE AVKDCFSTND AIFSNRPAFL YGDYLGYNNA
121 MLFLANYGPY WRKNRKLVIQ EVLSASRLEK FKHVRFARIQ ASIKNLYTRI DGNSSSTINLT
181 DWLEELNFGI IVKMIAGKNY ESGKGDEQVE RFKKAFKDFM ILSMEFVLWD AFPIPLFKWV
241 DFQGHVKAMK RTFKDIDSVF QNWLEEHINK REKMEVNAEG NEQDFIDVVL SKMSNEYLGE
301 GYSRDTVIAK TVFSLVLDA DTVLHINWG MALLINNQKA LTKAQEEIDT KVGKDRWVEE
361 SDIKDLVYLQ AIVKEVLRLY PPGPLLVPHE NVEDCVVSGY HIPKGTRLEA NVMKLQRPDK
421 LWSDPDTFDP ERFIATDIDF RGQYYKYIPF GSGRRSCPGM TYALQVEHLT MAHLIQGFNY
481 RTPNDEPLDM KEGAGITIRK VNPVELIIAP RLAPELY

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FIG. 92

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NAME D122-AF10  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 183

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1 CTAAAACTCC ATAATGGTTT CTCCCGTAGA AGCCATTGTA GGACTAGTAA CCCTTACACT
61 TCTCTTCTAC TTCCTATGGC CCAAAAAATT TCAAATACCT TCAAAACCAT TACCACCGAA
121 AATTCCCAGA GGGTGGCCGG TAATCGGCCA TCTTTTCTAC TTCGATGATG ACGGCGACGA
181 CCGTCCATTA GCTCGAAAAC TCGGAGACTT AGCTGACAAA TACGGCCCGG TTTTCACTTT
241 CCGGCTAGGC CTTCCGCTTG TGTTAATTGT AAGCAGTTAC GAAGCTGTAA AAGACTGCTT
301 CTCTACAAAT GACGCCATTT TCTCCAATCG TCCAGCTTTT CTTTACGGTG AATACCTTGG
361 CTACAATAAT GCCATGCTAT TTTTGACAAA ATACGGACCT TATTGGCGAA AAAATAGAAA
421 ATTAGTCATT CAGGAAGTTC TCTCTGCTAG TCGTCTCGAA AAATTGAAGC ACGTGAGATT
481 TGGTAAAATT CAAACGAGCA TTAAGAGTTT ATACACTCGA ATTGATGGAA ATTCGATAC
541 GATAAATCTA ACTGATTGGT TAGAAGAATT GAATTTTGGT CTGATCGTGA AAATGATCGC
601 TGGGAAAAAT TATGAATCCG GTAAAGGAGA TGAACAAGTG GAGAGATTTA GGAAAGCGTA
661 TAAGGATTTT ATAATTTTAT CAATGGAGTT TGTGTTATGG GATGCTTTTC CAATTCATT
721 GTTCAAATGG GTGGATTTTC AAGGCTATGT TAAGGCCATG AAAAGGACAT TTAAGGATAT
781 AGATTCTGTT TTTCAGAAAT GGTTAGAGGA ACATGTCAAG AAAAGAGAAA AAATGGAGGT
841 TAATGCACAA GGAATGAAC AAGATTTTAT TGATGTGGTG CTTTCAAAAA TGAGTAATGA
901 ATATCTTGAT GAAGTTACT CTCGTGATAC TGTCAATAAA GCAACAGTGT TTAGTTTGGT
961 CTTGGATGCT GCGGACACAG TTGCTCTTCA CATGAATTGG GGAATGGCAT TACTGATAAA
1021 CAATCAACAT GCCTTGAAGA AAGCACAAGA AGAGATCGAT AAGAAAGTTG GTAAGGAAAG
1081 ATGGGTAGAA GAGAGTGATA TTAAGGATTT GGTCTACCTC CAAGCTATTG TTAAGGAAGT
1141 GTTACGATTA TATCCACCAG GACCTTTATT AGTACCTCAT GAAAATGTAG AGGATTGTGT
1201 TGTTAGTGGA TATCACATTC CTAAAGGGAC TAGACTATTC GCGAACGTTA TGAAATTGCA
1261 GCGCGATCCT AAACCTGGT CAAATCCTGA TAAGTTTGAT CCAGAGAGAT TCTTCGCTGA
1321 TGATATTGAC TACCGTGGTC AGCACTATGA GTTTATCCCA TTTGGTTCTG GAAGACGATC
1381 TTGTCCGGGG ATGACTTATG CATTACAAGT GGAACACCTA ACAATAGCAC ATTTGATCCA
1441 GGGTTTCAAT TACAAAACCT CAAATGACGA GCCCTTGGAT ATGAAGGAAG GTGCAGGATT
1501 AACTATACGT AAAGTAAATC CTGTAGAAGT GACAATTACG GCTCGCCTGG CACCTGAGCT
1561 TTATTAAAC CTTAGATGTT TTATCTTGAT TGTACTAATA TATATATGCA GAAAAAATTG

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SEQ. ID. NO. 184

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1 MVSPVEAIVG LVTLTLLFYF LWPKKFQIPS KPLPPKIPGG WPVIGHLFYF DDDGDDRPLA
61 RKLGLADKY GPVFTFRLGL PLVLIVSSYE AVKDCFSTND AIFSNRPAFL YGEYLGYNNA
121 MLFLTKYGPY WRKNRKLVIQ EVLSASRLEK LKHVRFGKIQ TSIKSLYTRI DGNSSTINLT
181 DWLEELNFGI IVKMIAGKNY ESGKGDEQVE RFRKAYKDFI ILSMEFVLWD AFPIPLFKWV
241 DFQGYVKAMK RTFKDIDSVF QNWLEEHVKK REKMEVNAQG NEQDFIDVVL SKMSNEYLDE
301 GYSRDTVIAK TVFSLVLDAE DTVALHMNWG MALLINNQHA LKKAQEEIDK KVGKERWVEE
361 SDIKDLVYLO AIVKEVLRLY PPGPLIVPHE NVEDCVVSGY HIPKGTRLF A NVMKLQRDPK
421 LWSNPDKFDI ERFFADDIDY RGQHYEFIPF GSGRRSCPGM TYALQVEHLT IAHLIQGFNY
481 KTPNDEPLDM KEGAGLTIRK VNPVEVTITA RLAPELY

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FIG. 93

34/111

NAME D128-AB7  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 185

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1 CGAGGCTCCC CACCAAAAAA TCATTTCTCT CGTCTAAAAT GGATCTTCTC TTACTAGAGA
61 AGACCTTAAT TGGTCTTTTC TTTGCCATTT TAATCGCTTT AATTGTCTCT AAACCTTCGTT
121 CAAAGCGTTT TAAGCTTCCT CCAGGACCAA TTCCAGTACC AGTTTGTGGT AATTGGCTTC
181 AAGTTGGTGA TGATTAAAC CACAGAAATC TTACTGATTA TGCCAAAAAA TTTGGCGATC
241 TTTTCTTGTT AAGAATGGGT CAACGTAAC TAGTTGTTGT GTCATCTCCT GAATTAGCTA
301 AAGAAGTTTT ACACACACAA GGTGTTGAAT TTGGTTCAAG AACAAGAAAT GTTGTGTTTG
361 ATATTTTTTAC TGGAAAAGGT CAAGATATGG TTTTACTGT ATATGGTGAA CATTGGAGAA
421 AAATGAGGAG AATTATGACT GTACCATTTT TTACTAATAA AGTTGTGCAA CAGTATAGAG
481 GGGGGTGGGA GTTTGAGGTG GCAAGTGTA TTAGGAGATG GAAAAAAAT CCTGAATCTG
541 CTACTAATGG GATCGTATTA AGGAGGAGAT TACAATTAAT GATGTATAAT AATATGTTTA
601 GGATTATGTT TGATAGGAGA TTTGAGAGTG AAGATGATCC TTTGTTTGTT AAGCTTAAGG
661 CTTTGAATGG TGAAAGGAGT AGATTGGCTC AAAGTTTTGA GTATAATTAT GGTGATTTTA
721 TTCCAATTTT GAGGCCTTTT TTGAGAGGTT ATTTGAAGAT CTGTAAAGAA GTTAAGGAGA
781 AGAGGCTGCA GCTTTTCAAA GATTACTTTG TTGATGAAAG AAAGAAGCTT TCAAATACCA
841 AGAGCTCGGA CAGCAATGCC CTAAAATGTG CGATTGATCA CATCTTGAG GCTCAACAGA
901 AGGGAGAGAT CAATGAGGAC AACGTTCTTT ACATTGTTGA AAACATCAAT GTTGCTGCAA
961 TTGAAACAAC ATTATGGTCA ATTGAGTGGG GTATCGCCGA GCTAGTCAAC CACCCTCACA
1021 TCCAAAAGAA ACTGCGCGAC GAGATTGACA CAGTTCTTGG ACCAGGAGTG CAAGTGACTG
1081 AACCAGACAC CCACAAGCTT CCATACCTTC AGGCTGTGAT CAAGGAGGCA CTTCGTCTCC
1141 GTATGGCAAT TCCTCTATTA GTCCACACA TGAACCTTCA CGACGCAAAG CTTGGCGGGT
1201 TTGATATTCC AGCAGAGAGC AAAATCTTGG TTAACGCTTG GTGGTTAGCT AACAACCCGG
1261 CTCATTGGAA GAAACCCGAA GAGTTCAGAC CCGAGAGGTT CTTTGAAGAG GAGAAGCATG
1321 TTGAGGCCAA TGGCAATGAC TTCAGATATC TTCCGTTTGG CGTTGGTAGG AGGAGCTGCC
1381 CTGGAATTAT ACTTGCAATG CCAATTCTTG GCATCACTTT GGGACGTTTG GTTCAGAACT
1441 TTGAGCTGTT GCCTCCTCCA GGCCAGTCGA AGCTCGACAC CACAGAGAAA GGTGGACAGT
1501 TCAGTCTCCA CATTTTGAAG CATTCCACCA TTGTGTTGAA ACCAAGGTCT TTCTGAACCT
1561 TGTGATCTTA TTAATTAAGG GGTTCTGAAG AAATTTGATA GTGTTGGATA TTAAGGGCGA
1621 ATT

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SEQ. ID. NO. 186

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1 MDLLLLLEKTL IGLFFAILIA LIVSKLRSKR FKLPPGPIPV PVFGNWLQVG DDLNHRNLTD
61 YAKKFGDLFL LRMGQRNLVV VSSPELAKEV LHTQGVFEGS RTRNVVFDIF TGKGQDMVFT
121 VYGEHWRKMR RIMTVPFFTN KVVQYRGGW EFEVASVIED VKKNPESATN GIVLRRRLQL
181 MMYNNMFRIM FDRRFESDD PLFVKLKAIN GERSRLAQSF EYNYGDFIPI LRPFLRGYLK
241 ICEVKEKRL QLFKDYFVDE RKKLSNTKSS DSNALKCAID HILEAQQKGE INEDNVLYIV
301 ENINVAAIET TLWSIEWGIA ELVNHPIHQ KLRDEIDTVL GPGVQVTEPD THKLPYLQAV
361 IKEALRLRMA IPLLVPHMNL HDAKLGGFDI PAESKILVNA WWLANNPAHW KKPEEFRPER
421 FFEEEKHVEA NGNDFRYLPF GVGRRSCPGI ILALPILGIT LGRLVQNFEL LPPPGQSKLD
481 TTEKGGQFSL HILKHSTIVL KPRSF

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NAME D129-AD10  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 187

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1 CAACACGCTT ACTATCTCCT AAATCTCCAC TCAAAAACAA AGAAGAGAAA GATTTAAAAAC
61 TAATAATTAT GAAAGAGATG GTGCAAAACA ATATGAGCAC TTCTCTTCTT GAAACTTTAC
121 AAGCTACGCC CATGATATTC TACTTCATCG TCCCTCTCTT CTGCTTATTC CTTCTCTCCA
181 AATCTCGCCG TAAACGTTTG CCTCCAGGTC CAACTGGCTG GCCTCTCATT GGTAAACATGA
241 TGATGATGGA CCAGTTAACT CACCGTGGCC TTGCCAAACT AGCCCCAAAA TATGGTGGTG
301 TTTTTCACCT TAAAATGGGT TATGTTTACA AAATTGTAGT CTCTGGTCCA GACGAAGCTC
361 GCCAAGTATT ACAGGAACAC GACATCATAT TTTCGAACCG TCCAGCGACC GTAGCCATAA
421 GTTACCTAAC ATATGACAGG GCAGACATGG CTTTGTGCTGA CTATGGACTC TTCTGGCGGC
481 AGATGAGAAA ACTATGTGTA ATGAAACTCT TCAGCCGCAA ACGAGCTGAG TCATGGGACT
541 CAGTTCGAGA CGAAGCGGAT TCCATGGTTA GAATTGTAAC AACCAACACA GGCACAGCTG
601 TTAACTTAGG TGAAC TTGTT TTCAGTCTCA CTCGTAATAT TATCTACAGA GCTGCTTTTG
661 GAACTTGTTT TGAAGATGGA CAAGGCGAGT TCATTGAAAT TATGCAAGAG TTTTCGAAGC
721 TATTTGGCGC TTTCAATATA GCTGATTTTA TTCCATGGCT AGGGTGGGTT GGTAAAGCAG
781 GTCTAAATAT TAGACTTGCT AAGGCTAGAG CGTCGCTTGA TGGGTTTCATT GATTCGATTA
841 TTGATGACCA TATTATTAGA AAGAAAGCTT ATGTTAATGG CAAAATGAT GGAGGTGATC
901 GAGAAACTGA TATGGTGGAT GAGCTTTTAG CTTTTTACAG TGAGGAAGCA AAAGTAACTG
961 AGTCCGAAGA TTTGCAGAAT GCTATCAGAC TTAATAAGGA TAGTATCAAA GCTATCATCA
1021 TGGATGTAAT GTTTGGAGGG ACAGAAACAG TGGCTTCTGC AATAGAATGG GCCATGGCAG
1081 AGCTTATGAG GAGTCCTGAA GATCTTAAAA AAGTACAACA AGGGCTGGCT AACGTTGTTG
1141 GACTCAACAG AAAAGTTGAA GAATCTGACT TTGAAAAATT AACATACTTA AGATGTTGTC
1201 TAAAAGAAAC TCTACGACTT CACCCTCCAA TCCCTCTCCT CCTCCATGAG ACCGCCGAGG
1261 AATCCACCGT CTCCGGCTAC CATATTCCGG CAAAGTCACA TGTTATTATA AATTCATTTG
1321 CCATTGGGCG TGACAAAAAT TCATGGGAAG ATCCTGAAAC TTATAAACCA TCTAGGTTTC
1381 TCAAAGAAGG TGTACCAGAT TTTAAAGGAG GTAATTTTGA GTTTATACCA TTTGGGTCGG
1441 GTCGGCGGTC TTGCCCCGGT ATGCAACTTG GGCTTTATGC ATTGGAAATG GCTGTGGCCC
1501 ATCTTCTTCA TTGTTTTACT TGGGAATTGC CAGATGGTAT GAAACCAAGT GAGCTTAAAA
1561 TGGATGATAT TTTTGGACTC ACTGCTCCAA GAGCTAATCG ACTCGTGGCT GTGCCTACTC
1621 CACGCTTGTT GTGTCCCCTT TATTAATTGA AGAAAAAGG TGGGGCT

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SEQ. ID. NO. 188

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1 MKEMVQNNMS TSLLETLOAT PMIFYFIVPL FCLFLLSKSR RKRLPPGPTG WPLIGNMMMM
61 DQLTHRGLAK LAQKYGGVFH LKMGYVHKIV VSGPDEARQV LQEHDIIFS NRPATVAISYL
121 TYDRADMAFA DYGLFWRQMR KLCVMKLF SR KRAESWDSVR DEADSMVRIV TTNTGTAVNL
181 GELVFSLTRN IIYRAAFGTC SEDGQGEFIE IMQEF SKLFG AFNIADFIPW LGWVGKQSLN
241 IRLAKARASL DGFIDSIIDD HIIRKKAYVN GKNDGGDRET DMVDELLAFY SEEAKVTESE
301 DLQNAIRLTK DSIKAIIMDV MFGGTETVAS AIEWAMAE LM RSPEDLKKVQ QGLANVVGLN
361 RKVEESDFEK LTYLRCLLKE TLRLHPPIPL LLHETAEEST VSGYHIPAKS HVIINSFAIG
421 RDKN SWEDPE TYKPSRFLKE GVPDFKGGNF EFIPFGSGRR SCPGMQLGLY ALEMAVAHLL
481 HCFTWELPDG MKPSELKMDD IFGLTAPRAN RLVAVPTPRL LCPLY

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NAME D135-AE1  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 189

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1 GGGGGATAAG AATATGGAGA TACCATATTA CAGCTTAAAA CTTACAATTT TTTCAATTGC
61 AATTATCTTT GTACTAAGAT GGGCATGGAA AATCTTGAAT TATGTGTGGT TAAAACCAA
121 AGAATTGGAG AAATGCATCA GACAGCAGGG TTTCAAAGGA AACTCTTACA AATTCTTGTT
181 TGGGGATATG AAAGAGATAA AGAAAATGGG TGAAGAAGCT ATGTCTAAGC CAATCAATTT
241 CTCTCATGAC ATGATTTGGC CTAGAGTCAT GCCCTTCATC CACAAAACCA TCACCAATTA
301 TGGTAAGAA TGT TTTTGTGT GGT TTTGGGCC AAGACCAGCA GTCCTGATCA CAGACCCGGA
361 ACTTGTAAG GAGGTGCTAA CGAAGAATTT CGTTTATCAG AAGCCACCTG GCACTCCACT
421 CACAAAATTG GCAGCAACTG GAATTGCAGG CTATGAAACA GATAAATGGG CTACACATAG
481 AAGGCTTCTC AATCCTGCTT TTCACCTTGA CAAGTTGAAG CATATGCTAC CTGCATTCCA
541 ATTTACTGCT TGTGAGATGT TGAGCAAATT GGAGAAAGTT GTCTCACCAA ATGGAACAGA
601 GATAGATGTG TGGCCATATC TACAACTTT AACAAGTGAT GCCATTTCAA GAACTGCTTT
661 TGGCAGTAGT TATGAAGAAG GAAGAAAGCT TTTTGAAGTT CAAAAGGAAC AACTTTCACT
721 AATCTAGAA GTGTCCCGCA CAATATACAT CCCAGGATGG AGGTTTTTGC CAACAAAAG
781 GAACAAAAGG ATGAAGCAAA TATTTAATGA AGTACGAGCG CTGGTATTGG GAATTATTAA
841 GAAAAGATTG AGTATGATTG AAAATGGAGA AGCTCCTGAT GATTTATTGG GTATATTATT
901 GGCATCCAAT TTTAAAAGAAA TCCAACAACA TGGAATAAC AAGAAATTTG GTATGAGTAT
961 TGATGAGGTG ATTGAAGAGT GTAACTCTT CTATTTTTCG GGGCAAGAGA CACTTTCATC
1021 TTTACTTGTA TGGACTATGA TTTTGTGTG CAAACATCCT AGTTGGCAAG ATAAAGCTAG
1081 AGAAGAGGTT TTGCAAGTGT TTGGAAGTAG GGAAGTTGAC TATGACAAGT TGAATCAGCT
1141 AAAAATAGTA ACTATGATCT TAAACGAGGT CTTAAGGTTG TATCCAGCAG GATATGCGAT
1201 TAATCGAATG GTAACCAAAG AAACAAAGTT AGGGAATTTA TGTTTACCAG CTGGGGTACA
1261 ACTCTTGTTA CCAACAATTT TGTGCAACA TGATACTGAA ATATGGGGAG ATGATGCAAT
1321 GGAGTTCAAT CCAGAGAGAT TTAGTGATGG AATATCCAAA GCAACAAAAG GAAAACCTGT
1381 GTTCTTTCCA TTTAGTTGGG GTCCAAGAAT ATGTATTGGG CAAAATTTTG CTATGTTAGA
1441 GGCCAAGATG GCAATGGCTA TGATTCTGAA AACTATGCA TTTGAAGTCT CTCCATCTTA
1501 TGCTCATGCT CCTCATCCAC TACTACTTCA ACCTCAATAT GGTGCTCAAT TAATTTTGTA
1561 CAAGTTGTAG AAATGGTCAA TTTGGAAGTT GTTATGGAAC TTTTATCATC GTAATCAACC

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SEQ. ID. NO. 190

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1 MEIPYYSKLK TIFSFAIIFV LRWAWKILNY VWLKPKELEK CIRQQGFKN SYKFLFGDMK
61 EIKKMGEEM SKPINFSHDM IWPRVMPFIH KTITNYGKNC FVWFGPRPAV LITDPELVKE
121 VLTKNFVYQK PPGTPLTKLA ATGIAGYETD KWATHRRLN PAFHLDKLKH MLPAFQFTAC
181 EMLSKLEKVV SPNGTEIDVW PYLQTLTSDA ISRTAFGSSY EEGRKLFELQ KEQLSLILEV
241 SRTIYIPGWR FLPTKRNRKM KQIFNEVRAL VLGIKKRLS MIENGEAPDD LLGILLASNL
301 KEIQQHGNK KFGMSIDEVI EECKLFYFAG QETSSLLVW TMILLCKHPS WQDKAREEVL
361 QVFGSREVDY DKLNLKIVT MILNEVLRLY PAGYAINRMV TKETKLGNLC LPAGVQLLLP
421 TILLQHDTEI WGDDAMEFNP ERFSDGISKA TKGKLVFFPF SWGPRICIGQ NFAMLEAKMA
481 MAMILKNYAF ELSPSYAHAP HPLLLQPQYG AQLILYKL

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FIG. 96

NAME D141-AD7  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 191

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1 GTCCTAACTA AAAATGGAGA TTCAGTTTTC TAACTTAGTT GCATTCTTGC TCTTTCTCTC
61 CAGCATCTTT CTTCTATTCA AAAAATGGAA AACCAGAAAA CTAAATTTGC CTCCTGGTCC
121 ATGGAAATTA CTTTTTATTG GAAGTTTACA CCATTGGGCT GTGGCAGGTC CACTTCCTCA
181 CCATGGCCTA AAAAATTTAG CCAAACGCTA TGGTCCTCTT ATGCATTTAC AACTTGGACA
241 AATTCCTACA CTCATCATAT CATCACCTCA AATGGCAAAA GAAGTACTAA AAACCTACGA
301 CCTCGCTTTT GCCACTAGAC CAAAGCTTGT CGTGGCCGAC ATCATTCACT ACGACAGCAC
361 GGACATAGCA TTTTCTCCGT ACGGTGAATA CTGGAGACAA ATTCGTAAAA TTTGCATATT
421 GGAACCTCTG AGTGCCAAGA TGGTCAAATT TTTTAGCTCG ATTCGCCAAG ATGAGCTCTC
481 GAAGATGCTC TCATCTATAC GAACGACACC CAATCTTACA GTCAATCTTA CTGACAAAAT
541 TTTTTGGTTT ACGAGTTCGG TAACTTGTAG ATCAGCTTTA GGGAAGATAT GTGGTGACCA
601 AGACAAATTG ATCATTTTTC TGAGGGAAAT AATATCATTG GCAGGTGGAT TTAGTATTGC
661 TGATTTTTTC CCTACATGGA AAATGATTCA TGATATTGAT GGTTCGAAAT CTAAACTGGT
721 GAAAGCACAT CGTAAGATTG ATGAAATTTT GGGAAATGTT GTTGATGAGC ACAAAAAGAA
781 CAGAGCAGAT GGCAAGAAGG GTAATGGTGA ATTTGGTGGT GAAGATTTGA TTGATGTATT
841 GTTAAGAGTT AGAGAAAGTG GAGAAGTTCA AATTCCTATC ACAAATGACA ATATCAAATC
901 AATATTAATC GACATGTTCT CTGCGGGATC TGAAACATCA TCGACGACTA TAATTTGGGC
961 ATTAGCTGAA ATGATGAAGA AACCAAGTGT TTTAGCAAAG GCACAAGCTG AAGTAAGGCA
1021 AGCTTTGAAG GAGAAAAAAG GTTTTCAACA GATTGATCTT GATGAGCTAA AATATCTCAA
1081 GTTAGTAATC AAAGAAACCT TAAGAATGCA CCCTCCAATT CCTCTATTAG TTCCTAGAGA
1141 ATGTATGGAG GATACAAAGA TTGATGGTTA CAATATACCT TTCAAACAA GAGTCATAGT
1201 TAATGCATGG GCAATCGGAC GAGATCCAGA AAGTTGGGAT GACCCCGAAA GCTTTATGCC
1261 AGAGAGATTT GAGAATAGTT CTATTGACTT TCTTGGAAT CATCATCAGT TTATACCAT
1321 TGGTGACAGG AGAAGGATTT GTCCGGGAAT GCTATTGGT TTAGCTAATG TTGGACAACC
1381 TTTAGCTCAG TTACTTTATC ACTTCGATTG GAAACTCCCT AATGGACAAA GTCATGAGAA
1441 TTTGACATG ACTGAGTCAC CTGGAATTTT TGCTACAAGA AAGGATGATC TTGTTTGTAT
1501 TGCCACTCCT TATGATTCTT ATTAAGCAGT AGCAGAAATA AAAAGCCGGG GCAAACAGAA
1561 AAAAGT

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SEQ. ID. NO. 192

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1 MEIQFSNLVA FLLFLSSIFL LFKKWKTRKL NLPPGPWKLP FIGSLHHLAV AGPLPHHGLK
61 NLAKRYGPLM HLQLGQIPTL IISSPQMAKE VLKTHDLAFA TRPKLVVADI IHYDSTDIAF
121 SPYGEYWRQI RKICILELLS AKMVKEFSSI RQDELSKMLS SIRTTPNLTV NLTDKIFWFT
181 SSVTCRSALG KICGDQDKLI IFMREIISLA GGFSIADFFP TWKMIHDIDG SKSKLVKAHR
241 KIDEILGNV DEHKKNRADG KKGNGEFGGE DLIDVLLRVR ESGEVQIPIT NDNIKSILID
301 MFSAGSETSS TTIIWALAEM MKKPSVLAKA QAEVRQALKE KKGQQIDLD ELKYLKLVIK
361 ETLRMHPPIP LLVPRECMED TKIDGYNIPF KTRVIVNAWA IGRDPESWDD PESFMPERFE
421 NSSIDFLGNH HQFIFPGAGR RICPGMLFGL ANVGQPLAQL LYHFDWKLPN GQSHENFDMT
481 ESPGISATRK DDLVLIATPY DSY

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FIG. 97

NAME D147-AD3  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 193

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1  CAACTAACAA ACACATTGAG TCCTCTCCCA AATCACTGAT TCACCACCAA AAGTACCAAC
61 AATTCAATGG AAGGTACAAA CTTGACTACA TATGCAGCAG TATTTCTTGA TACTCTGTTT
121 CTTTTGTTCC TTTCCAAACT TCTTCGCCAG AGGAAACTCA ATTTACCTCC AGGCCCCAAA
181 CCATGGCCGA TCATCGGAAA CTTAAACCTT ATTGGCAATC TTCCTCATCG CTCAATCCAC
241 GAACTCTCCC TCAAGTACGG ACCCGTTATG CAACTCCAAT TCGGGTCTTT CCCCCTTGTA
301 GTTGGATCCT CCGTCGAAAT GGCTAAGATT TTCCTCAAAT CCATGGATAT TAACTTTGTA
361 GGCAGGCCTA AAACGGCTGC CGGAAAATAC ACAACGTACA ATTATTCCGA TATTACATGG
421 TCTCCTTACG GACCATATTG GCGCCAGGCA CGTAGGATGT GCCTAACGGA ATTATTCAGC
481 ACGAAACGTC TCGATTCATA CGAGTATATT CGGGCTGAGG AGTTGCATTC TCTTCTCCAT
541 AATTTGAACA AAAATATCAGG GAAACCAATT GTGTTGAAAG ATTATTCGAC GACGTTGAGT
601 TTAAATGTTA TTAGCAGGAT GGTACTGGGG AAAAGGTATT TGGACGAATC CGAGAACTCG
661 TTCGTGAATC CTGAGGAATT TAAGAAGATG TTGGACGAAT TGTTTTTGCT AAATGGTGTA
721 CTTAATATTG GAGATTCAAT TCCATGGATT GATTTTCATG ATTTGCAAGG TTATGTTAAG
781 AGGATGAAAG TAGTGAGCAA GAAATTCGAC AAGTTTTTAG AGCATGTTAT TGATGAGCAT
841 AACATTAGGA GAAATGGAGT GGAGAATTAT GTTGCTAAGG ATATGGTGGA TGTTTTGTTG
901 CAGCTCGCTG ATGATCCGAA GTTGGAAGTT AAGCTGGAGA GACATGGAGT CAAAGCATTC
961 ACTCAGGATA TGCTGGCTGG TGGAAACGAG AGTTCAGCAG TGACAGTGGA GTGGGCAATT
1021 TCAGAGCTGC TAAAGAAGCC GGAGATTTTC AAAAAGGCTA CAGAAGAATT GGATCGAGTA
1081 ATTGGGCAGA ATAGATGGGT ACAAGAAAAG GACATTCCAA ATCTTCCTTA CATAGAGGCA
1141 ATAGTCAAAG AGACTATGCG ACTGCACCCC GTGGCACCAG TGTTGGTGCC ACGTGAGTGT
1201 CGAGAAGATA TTAAGGTAGC AGGCTACGAC GTTCAGAAAG GAACTAGGGT TCTCGTGAGT
1261 GTATGGACTA TTGGAAGAGA CCCTACATTG TGGGACGAGC CTGAGGTGTT CAAGCCGGAG
1321 AGATTCCATG AAAGGTCCAT AGATGTTAAA GGACATGATT ATGAGCTTTT GCCATTTGGA
1381 GCGGGGAGAA GAATGTGCCC GGGTTATAGC TTGGGGCTCA AGGTGATTCA AGCTAGCTTA
1441 GCTAATCTTC TACATGGATT TAACTGGTCA TTGCCTGATA ATATGACTCC TGAGGACCTC
1501 AACATGGATG AGATTTTGG GCTCTCTACA CCTAAAAAAT TTCCACTTGC TACTGTGATT
1561 GAGCCAAGAC TTTCACCAAA ACTTTACTCT GTTTGATTCA GCAGTCTAT GGTCCGTC
1621 AGATAGACTT TGTTACGTTT GAACCTGTGC TC

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SEQ. ID. NO. 194

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1  MEGTNLTYYA AVFLDTLFLF FLSKLLRQRK LNLPPGPKPW PIIGNLNLIG NLPHRSIHLE
61 SLKYGPVMQL QFGSEFPVVG SSVEMAKIFL KSMDINLVGR PKTAAGKYTT YNYSBITWSP
121 YGPYWRQARR MCLTELESTK RLDSYEYIRA EELHSLHLNL NKISGKPIVL KDYSTTSLN
181 VISRMVLGKR YLDESENSFV NPPEEFKMLD ELFLNLGNVL IGDSIPWIDF MDLQGYVKRM
241 KVVSKKFDKF LEHVIDEHNI RRNGVENYVA KDMVDVLLQL ADDPKLEVKL ERHGVKFTQ
301 DMLAGGTESS AVTVEWASE LLKKPEIFKK ATEELDRVIG QNRWVQEKDI PNLPYIEAIV
361 KETMRLHPVA PMLVPRECRE DIKVAGYDVQ KGTRVLVSVW TIGRDP TLWD EPEVFKPERF
421 HERSIDVKGH DYELLFPFAG RRMCPGYSLG LKVIQASLAN LLHGFNWSLP DNMTPELDNM
481 DEIFGLSTPK KFPLATVIEP RLSPKLYSV

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NAME D163-AF12  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 195

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1 CTTCTTCCTT CCTAACTAAA AATGGAGATT CAGTTTTCTA ACTTAGTTGC ATTCTTGCTC
61 TTTCTCTCCA GCATCTTTCT TGTATTCAAA AAATGGAAAA CCAGAAAACT AAATTTGCCT
121 CCTGGTCCAT GGAAATTACC TTTTATTGGA AGTTTACACC ATTTGGCTGT GGCAGGTCCA
181 CTTCTCACC ATGGCCTAAA AAATTTAGCC AAACGCTATG GTCCTCTTAT GCATTTACAA
241 CTTGGACAAA TTCCTACACT CGTCATATCA TCACCTCAA TGGCAAAAGA AGTACTAAAA
301 ACTCACGACC TCGCTTTTGC CACTAGACCA AAGCTTGTCG TGGCCGACAT CATTCACTAC
361 GACAGCACGG ACATAGCATT TTCGCCATAC GGTGAATACT GGAGACAAAT TCGTAAAATT
421 TGCATATTGG AACTCTTGAG TGCCAAGATG GTCAAGTTTT TTAGCTCGAT TCGCCAAGAT
481 GAGCTCTCGA AGATGGTTTC ATCTATACGA ACGACGCCCA ATCTTCCAGT CAATCTTACC
541 GACAAGATTT TTTGGTTTAC GAGTTCGGTA ATTTGTAGAT CAGCTTTAGG GAAGATATGT
601 GGTGACCAAG ACAAATTGAT CATTTTTATG AGGGAAATAA TATCATTGGC AGGTGGATTT
661 AGTATTGCTG ATTTTTTCCC TACATGGAAA ATGATTCATG ATATTGATGG TTCAAATCT
721 AAAGTGGTGA AGGCACATCG TAAGATTGAT GAAATTTTGG AAAATGTGGT AAATGAGCAC
781 AAACAGAATC GAGCAGATGG TAAAAAGGGT AATGGTGAAT TTGGTGGAGA AGATCTGATT
841 GATGTTTTGT TAAGAGTTAG AGAAAGTGGG GAAGTTCAA TTCCAATCAC AGATGACAAT
901 ATCAAATCAA TATTAATCGA CATGTTCTCT GCCGGATCGG AAACATCATC GACAACATA
961 ATTTGGGCAT TAGCTGAAAT GATGAAGAAA CCAAGTGTTT TAGCAAAGGC ACAAGCTGAA
1021 GTGAGGCAAG CTTTGAAGGG GAAGAAAATT AGTTTTCAAG AGATTGATAT TGATAAGCTA
1081 AAGTATTTGA AGTTAGTGAT CAAAGAAACT TTAAGAATGC ACCCTCCAAT TCCTCTGTTA
1141 GTCCCTAGAG AATGTATGGA AGATACAAAG ATTGATGGTT ACAATATACC TTCAAACA
1201 AGAGTCATTG TTAATGCATG GGCAATTGGA CGAGATCCTC AAAGTTGGA TGATCCTGAA
1261 AGCTTTACGC CAGAGAGATT TGAGAATAAT TCTATTGATT TTCTTGGA TAATCATCAA
1321 TTTATTCCAT TTGGTGCAGG AAGAAGGATT TGTCTTGGA TGCTATTTGG TTTAGCTAAT
1381 GTTGGACAAC CTTTAGCTCA GTTACTTTAT CACTTCGATT GGAACTCCC TAATGGACAA
1441 AGTCATGAGA ATTTGCACAT GACTGAGTCA CCTGGAATTT CTGCTACAAG AAAGGATGAT
1501 CTTGTTTTGA TTGCCACTCC TTATGATTCT TATTAAGCAG TAGCAGAAAT AAAAAGCCGG
1561 GGCAAACAGA AAAAAGTATT GCTGCTTCTA GGTATTTTCT ATTGGATAAA TTTCAAAT
1621 CATCCACAAT ATTTAGTGTT TGCTAGAGTT GGTAGC

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SEQ. ID. NO. 196

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1 MEIQFSNLVA FLLFLSSIFL VFKKWKTRKL NLPPGPWKLP FIGSLHHLAV AGPLPHHGLK
61 NLAKRYGPLM HLQLGQIPTL VISSPQMAKE VLKTHDLAFA TRPKLVVADI IHYDSTDIAF
121 SPYGEYWRQI RKICILELLS AKMKVFFSSI RQDELSKMVS SIRTTPNLPV NLTDKIFWFT
181 SSVICRSALG KICGDQDKLI IFMREIISLA GGFSIADFFP TWKMIHDIDG SKSKLVKAHR
241 KIDEILENVV NEHKQNRADG KKGNGEFGGE DLIDVLLRVR ESGEVQIPIT DDNIKSILID
301 MFSAGSETSS TTIIWALAEM MKKPSVLAKA QAEVRQALKG KKISFQEIDI DKLKYLKLV
361 KETLRMHPII PLLVPRECME DTKIDGYNIP FKTRVIVNAW AIGRDPQSWD DPESFTPERF
421 ENNSIDFLGN HHQFIPFGAG RRICPGMLFG LANVGOPLAQ LLYHFDWKLP NGQSHENFDM
481 TESPGISATR KDDLVLIA TP YDSY

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NAME D163-AG11  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 197

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1 CTTCTTCCTT CCTAACTAAA AATGGAGATT CAGTTTTTCTA ACTTAGTTGC ATTCTTGCTC
61 TTTCTCTCCA GCATCTTTCT TGTATTCAAA AAATGGAAAA CCAGAAAAC TAAATTTGCCCT
121 CCTGGTCCAT GGAAATTACC TTTTATTGGA AGTTTACACC ATTTGGCTGT GGCAGGTCCA
181 CTTCTCACC ATGGCCTAAA AAATTTAGCC AAACGCTATG GTCCTCTTAT GCATTTACAA
241 CTTGGACAAA TTCCTACACT CGTCATATCA TCACCTCAA TGGCAAAAGA AGTACTAAAA
301 ACTCACGACC TCGCTTTTGC CACTAGACCA AAGCTTGTCG TGGCCGACAT CATTCACTAC
361 GACAGCACGG ACATAGCACT TTCGCCATAC GGTGAATACT GGAGACAAAT TCGTAAAATT
421 TGCATATTGG AACTCTTGAG TGCCAAGATG GTCAAGTTTT TTAGCTCGAT TCGCCAAGAT
481 GAGCTCTCGA AGATGGTTTC ATCTATACGA ACGACGCCCA ATCTTCCAGT CAATCTTACC
541 GACAAGATTT TTTGGTTTAC GAGTTCGGTA ATTTGTAGAT CAGCTTTAGG GAAGATATGT
601 GGTGACCAAG ACAAATTGAT CATTTTTTATG AGGGAAATAA TATCATTGGC AGGTGGATTT
661 AGTATTGCTG ATTTTTTCCC TACATGGAAA ATGATTCATG ATATTGATGG TTCAAATCT
721 AAAGTGGTGA AGGCACATCG TAAGATTGAT GAAATTTTGG AAAATGTGGT AAATGAGCAC
781 AAACAGAATC GAGCAGATGG TAAAAAGGGT AATGGTGAAT TTGGTGGAGA AGATCTGATT
841 GATGTTTTGT TAAGAGTTAG AGAAAGTGGG GAAGTTCAAA TTCCAATCAC AGATGACAAT
901 ATCAAATCAA TATTAATCGA CATGTTCTCT GCCGGATCGG AAACATCATC GACAACATA
961 ATTTGGGCAT TAGCTGAAAT GATGAAGAAA CCAAGTGTTT TAGCAAAGGC ACAAGCTGAA
1021 GTGAGCCAAG CTTTGAAGGG GAAGAAAATT AGTTTTCAAG AGATTGATAT TGATAAGCTA
1081 AAGTATTTGA AGTTAGTGAT CAAAGAAACT TTAAGAATGC ACCCTCCAAT TCCTCTGTTA
1141 GTCCCTAGAG AATGTATGGA AGATACAAAG ATTGATGGTT ACAATATACC TTTCAAACA
1201 AGAGTCATTG TTAATGCATG GGCAATTGGA CGAGATCCTC AAAGTTGGGA TGATCCTGAA
1261 AGCTTTACGC CAGAGAGATT TGAGAATAAT TCTATTGATT TTCTTGAAAA TCATCATCAA
1321 TTTATTCCAT TTGGTGCAGG AAGAAGGATT TGTCTTGAA TGCTATTTGG TTTAGCTAAT
1381 GTTGGACAAC CTTTAGCTCA GTTACTTTAT CACTTCGATT GGAACTCCC TAATGGACAA
1441 ACTACCAAAA ATTTTCGACAT GACTGAGTCA CCTGGAATTT CTGCTACAAG AAAGGATGAT
1501 CTTATTTTGA TTGCCACTCC TGCTCATTCT TGATTAAGTA TTGCTGCTTT TCTATTGGAG
1561 AATTTTCAAA ATTCATCCAC AATATATAGT GTTTGCTAGA GTTGCTTAGC

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SEQ. ID. NO. 198

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1 MEIQFSNLVA FLLFLSSIFL VFKKWKTRKL NLPPGPWKLP FIGSLHHLAV AGPLPHHGLK
61 NLAKRYGPLM HLQLGQIPTL VISSPQMAKE VLKTHDLAFA TRPKLVVADI IHYDSTDIAL
121 SPYGEYWRQI RKICILELLS AKMVKFFSSI RQDELSKMVS SIRTTPNLPV NLTDKIFWFT
181 SSVICRSALG KICGDQDKLI IFMREIISLA GGFSIADFFP TWKMIHDIDG SKSKLVKAHR
241 KIDEILENVV NEHKQNRADG KKGNGEFGGE DLIDVLLRVR ESGEVQIPIT DDNIKSILID
301 MFSAGSETSS TTIIWALAEM MKKPSVLAKA QAEVSQALKG KKISFQEIDI DKLKYLKLV
361 KETLRMHPII PLLVPRECME DTKIDGYNIP FKTRVIVNAW AIGRDPQSWD DPESFTPERF
421 ENNSIDFLGN HHQFIPFGAG RRICPGMLFG LANVGQPLAQ LLYHFDWKLP NGQTHQNFDM
481 TESPGISATR KDDLILITP AHS

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FIG. 100

41/111

NAME D163-AG12  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 199

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1 ATCCCTTCTTC CTTCTAGGT CCTAACTAAA AATGGAGATT CAGTTTTCTA ACTTAGTTGC
61 ATTCTTGCTC TTTCTCTCCA GCATCTTTCT TCTATTCAA AAATGGAAAA CCAGAAAAC
121 AAATTTGCCT CCTGGTCCAT GGAAATTACC TTTTATTGGA AGTTTACACC ATTTGGCTGT
181 GGCAGGTCCA CTTCTCACC ATGGCCTAAA AAATTTAGCC AAACGCTATG GTCCCTCTTAT
241 GCATTTACAA CTTGGACAAA TTCCTACACT CATCATATCA TCACCTCAAA TGGCAAAAGA
301 AGTACTAAAA ACTCACGACC TCGCTTTTGC CACTAGACCA AAGCTTGTCTG TGGCCGACAT
361 CATTCACTAC GACAGCACGG ACATAGCATT TTCTCCGTAC GGTGAATACT GGAGACAAAT
421 TCGTAAAATT TGCATATTGG AACTCTTGAG TGCCAAGATG GTCAAATTTT TTAGCTCGAT
481 TCGCCAAGAT GAGCTCTCGA AGATGCTCTC ATCTATACGA ACGACACCCA ATCTTACAGT
541 CAATCTTACT GACAAAATTT TTTGGTTTAC GAGTTCGGTA ACTTGATAGT CAGCTTTAGG
601 GAAGATATGT GGTGACCAAG ACAAATTGAT CATTTTTATG AGGGAAATAA TATCATTGGC
661 AGGTGGATT AGTATTGCTG ATTTTTTCCC TACATGGAAA ATGATTCATG ATATTGATGG
721 TTCGAAATCT AAAGTGGTGA AAGCACATCG TAAGATTGAT GAAATTTTGG GAAATGTTGT
781 TGATGAGCAC AAAAAGAACA GAGCAGATGG CAAGAAGGGT AATGGTGAAT TTGGTGGTGA
841 AGATTTGATT GATGTATTGT TAAGAGTTAG AGAAAGTGGA GAAGTTCAAA TTCCTATCAC
901 AAATGACAAT ATCAAATCAA TATTAATCGA CATGTTCTCT GCGGGATCTG AAACATCATC
961 GACGACTATA ATTTGGGCAT TAGCTGAAAT GATGAAGAAA CCAAGTGTTT TAGCAAAGGC
1021 ACAAGCTGAA GTAAGCCAAG CTTTGAAAGG GAAAAAAGGT TTTCAACAGA TTGATCTTGA
1081 TGAGCTAAAA TATCTCAAGT TAGTAATCAA AGAAACCTTA AGAATGCACC CTCCAATTCC
1141 TCTATTAGTT CCTAGAGAAT GTATGGAGGA TACAAAGATT GATGGTTACA ATATACCTTT
1201 CAAAACAAGA GTCATAGTTA ATGCATGGGC AATCGGACGA GATCCAGAAA GTTGGGATGA
1261 CCCCAGAAAGC TTTATGCCAG AGAGATTTGA GAATAGTTCT ATTGACTTTC TTGGAAATCA
1321 TCATCAGTTT ATACCATTG GTGCAGGAAG AAGGATTGT CCGGGAATGC TATTTGGTTT
1381 AGCTAATGTT GGACAACCTT TAGCTCAGTT ACTTTATCAC TTCGATTGGA AACTCCCTAA
1441 TGGACAAAGT CATGAGAATT TCGACATGAC TGAGTCACCT GGAATTTCTG CTACAAGAAA
1501 GGATGATCTT GTTTTGATTG CCACTCCTTA TGATTCTTAT TAAGCAGTAG CAGAAATAAA
1561 AAGCCGGGGC AAACAGAAAA AAGTATTGCT GCTTCTAGGT ATTTTCTATT GGATAAATTT
1621 CAAAATTCAT CCACAATATT TAGTGTGTC TAGAGTTGGT TAGC

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SEQ. ID. NO. 200

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1 MEIQFSNLVA FLLFLSSIFL LFKKWKTRKL NLPPGPWKLP FIGSLHHLAV AGPLPHHGLK
61 NLAKRYGPLM HLQLGQIPTL IISSPQMAKE VLKTHDLAFA TRPKLVVADI IHYDSTDIAF
121 SPYGEYWRQI RKICILELLS AKMVKFFSSI RQDELSKMLS SIRTTPNLTV NLTDKIFWFT
181 SSVTCRSALG KICGDQDKLI IFMREIISLA GGFSIADFFP TWKMIHDIDG SKSKLVKAHR
241 KIDEILGNV DEHKKNRADG KKGNGEFGGE DLIDVLLRVR ESSEVQIPIT NDNIKSILID
301 MFSAGSETSS TTIIWALAEM MKKPSVLAKA QAEVRQALKE KKGFOQIDLD ELKYLKLVIK
361 ETLRMHPPPI LLVPRECMED TKIDGYNIPF KTRVIVNAWA IGRDPESWDD PESFMPERFE
421 NSSIDFLGNH HQFIPFGAGR RICPGMLFGL ANVGQPLAQL LYHFDWKLPN GQSHENFDMT
481 ESPGISATRK DDLVLIATPY DSY

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FIG. 101

NAME D205-BG9  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 201

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1 TTCTTATTTT GATTCAACCA TGGAGAACCA ATACTCCTAC TCATTCTCTT CCTACTTCTA
61 CTTAGCTATA GTACTGTTTC TTCTTCCAAT TTTGGTCAAA TATTTCTTCC ATCGGAGAAG
121 AAATTTACCT CCAAGTCCAT TTTCTCTTCC AATAATTGGT CACCTTTACC TTCTCAAGAA
181 AACTCTCCAT CTCACCTCTAA CATCCTTATC AGCTAAATAT GGTCTGTGTT TATACCTCAA
241 ATTGGGCTCT ATGCCTGTGA TTGTTGTGTC CTCACCATCT GCTGTTGAAG AATGTTTAAC
301 CAAGAATGAT ATCATATTCT CAAATAGGCC CAAGACCGTG GCTGGTGACA AGTTTACCTA
361 CAATTATACT GTTTATGTTT GGGCACCTTA TGGCCAACCT TGGAGAATTC TTCGCCGATT
421 AACTGTCTGT GAACTCTTCT CTTACATAG CCTACAGAAA ACTTCTATCC TTAGAGATCA
481 AGAAGTTGCA ATATTTATCC GTTCGTTATA CAAATTCTCA AAGGATAGTA GCAAAAAAGT
541 CGATTTGACC AACTGGTCTT TTACTTTGGT TTTCAATCTT ATGACCAAAA TTATTGCTGG
601 GAGACATATT GTGAAGGAGG AAGATGCTGG CAAGGAAAAG GGCATTGAAA TTATTGAAAA
661 ACTTAGAGGG ACTTTCTTAG TAACATACATC ATTCTTGAAT ATGTGTGATT TCTTGCCAGT
721 ATTCAGGTGG GTTGGTTACA AAGGGCTGGA GAAGAAGATG GCCTCAATTC ACAATAGAAG
781 AAATGAATTC TTGAACAGCT TGCTTGATGA ATTTGACAC AAGAAAAGTA GTGCTTCACA
841 ATCTAACACA ACTGTTGGAA ACATGGAGAA GAAAACCACA CTGATTGAAA AGCTCTTGTC
901 TCTTCAAGAA TCAGAGCCTG AATTCTACAC TGATGATATC ATCAAAAGTA TTATGCTGGT
961 AGTTTTTGTG GCAGGAACAG AGACCTCATC AACAACCATC CAATGGGTAA TGAGGCTTCT
1021 TGTAGCTCAC CCTGAGGCAT TGTATAAGCT ACGAGCTGAC ATTGACAGTA AAGTTGGGAA
1081 TAAGCGCTTG CTGAATGAAT CAGACCTCAA CAAGCTCCG TATTTGCATT GTGTTGTTAA
1141 TGAGACAATG AGATTATACA CTCCGATACC ACTTTTATTG CCTCATTATT CAACTAAAGA
1201 TTGTATTGTG GAAGGATATG ATGTACCAA ACATACAATG TTGTTTGTCA ACGCTTGGGC
1261 CATTACAGG GATCCCAAGG TATGGGAGGA GCCTGACAAG TTCAAGCCAG AGAGATTGA
1321 GGCAACAGAA GGGGAAACAG AAAGGTTCAA TTACAAGCTT GTACCATTG GAATGGGGAG
1381 AAGAGCGTGC CCTGGAGCTG ATATGGGGTT GCGAGCAGTT TCTTTGGCAT TAGGTGCACT
1441 TATTCAATGC TTTGACTGGC AAATTGAGGA AGCGGAAAGC TTGGAGGAAA GCTATAATTC
1501 TAGAATGACT ATGCAGAACA AGCCTTTGAA GGTGTCTGCT ACTCCACGCG AAGATCTTGG
1561 CCAGCTTCTA TCCCAACTCT AAGGCAATTT ATCAATGCCA AACGTAATCT TCATCTACCA
1621 CTATG

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SEQ. ID. NO. 202

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1 MENQYSYSFS SYFYLAIVLF LLPILVKYFF HRRRNLPSP FSLPIIGHLY LLKKTLLHLL
61 TSLSAKYGPV LYLKLGSMVP IVVSSPSAVE ECLTKNDIIF ANRPKTVAGD KFTYNYTVYV
121 WAPYQQLWRI LRRLTVVELF SSHSLQKTSI LRDQEVAFI RSLYKFSKDS SKKVDLTNWS
181 FTLVFNLMTK IIAGRHIKVE EDAGKEKGIE IIEKLRGTFL VTTSFLNMCD FLPVFRWVG
241 KGLEKKMASI HNRNNEFLNS LLDEFRRHKS SASQSNTTVG NMEKKTTLIE KLLSLQSESE
301 EFTYDDIIS IMLVVFVAGT ETSSTTIQWV MRLVAHPEA LYKLRADIDS KVGKRLLENE
361 SDLNKLPLH CVVNETMRLY TPIPLLLPHY STKDCIVEGY DVPKHTMLFV NAWAIHRDPK
421 VWEEDPKFKP ERFEATEGET ERFNYKLVFP GMGRRACPGA DMGLRAVSLA LGALIQCDFW
481 QIEEAESLEE SYNSRMTMQN KPLKVVCTPR EDLGQLLSQL

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FIG. 102

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NAME D207-AA5  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 203

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1 AACCAACCTT CCTTTTCTTA CTTAGTAAAA TGGATATTCA GTCTTCTCCT TTCAACTTAA
61 TTGCTTTGCT ACTCTTCATT TCATTTCTTT TTATCCTATT GAAAAAGTGG AATACCAAAA
121 TCCCAAAGTT ACCTCCAGGT CCATGGAGAC TTCCCTTAT TGGCAGCCTC CATCACTTGA
181 AAGGTAAACT CCCACACCAT CATCTTAGAG ATTTAGCCCG AAAATATGGA CCTCTCATGT
241 ATTTACAAC TGGAGAAAGT CCGTAGTTG TAATATCTTC GCCACGTATA GCAAAGCTG
301 TACTAAAAAC TCATGATCTT GCTTTTGCAA CGAGGCCTCG GTTCATGTCC TCGGACATTG
361 TGTTTTACAA AAGCAGGGAC ATATCATTCG CCCCATATGG CGATTACTGG AGACAAATGC
421 GTAAAATATT AACACAAGAA CTCTTGAGTA ACAAGATGCT CAAGTCATTT AGCACAATCC
481 GAAAGGATGA GCTCTCGAAG CTCCTCTCGT CGATTCTGTT AGCAACAGCT TCTTCTGCAG
541 TGAACATAAA CGAAAAAGCT CTCTGGTTTA CAAGTTGCAT GACTTGTAGA TTAGCCTTTG
601 GAAAAATATG CAACGATCGT GATGAATTGA TTATGTTAAT AAGGGAGATA TTAGCATTAT
661 CAGGAGGATT TGATGTGTGT GATTTGTTCC CTTTCATGGAA ATTACTTCAC AATATGAGCA
721 ACATGAAAGC TAGATTGACG AATGTTTACC ATAAGTATAA TCTAATTATG GAGAATATCA
781 TCAATGAGCA CAAAGAGAAT CATGCAGCAG GGATAAAGGG AAATAACGAG TTTGGTGGCG
841 AAGATATGAT TGATGCTTTA CTGAGGGTTA AGGAGAATAA TGAGCTTCAA TTTCTATCG
901 AAAATGACAA CATGAAAGCA GTAATTCTGG ACTTGTTTAT TGCTGGAAC GAACTTCAT
961 ATACTGCAAT TATATGGGCA CTATCAGAAT TGATGAAGCA CCCAAGTGTT ATGGCCAAGG
1021 CACAAGCTGA AGTGAGAAAA GTCTTCAAAG AAAATGAAAA CTTGGACGAA AATGATCTTG
1081 ACAAGTTGCC ATACTTAAAA TCAGTGATCA AAGAAACACT AAGGATGCAT CCTCCAGTTC
1141 CTTTATTAGG ACCTAGAGAA TGCAGAGAAC AAATGAGAT TGATGGATAT ACTGTACCTC
1201 TTAAAGCTAG AGTAATGGTT AATGCATGGG CAATTGGAAG AGATCCTGAA AGTTGGGAAG
1261 ATCCTGAAAG TTTCAAACCC GAGCGATTTG AAAATATTTT TGTGATCTT ACGGGAAATC
1321 ACTATCAGTT CATCCCTTTC GGTTTCAGGA GAAGAATGTG TCCAGGAATG TCGTTTGGTT
1381 TAGTTAACAC TGGGCATCCT TTAGCTCAGT TGCTCTATTT CTTTGACTGG AAATTCCCTC
1441 ATAAGGTTAA TGCAGCTGAT TTTCACACTA CTGAAACAAG TAGAGTTTTT GCAGCAAGCA
1501 AAGATGACCT CTACTTGATT CCAACAAATC ACATGGAGCA AGAGTAGCTC TAAATTGAAT
1561 TCTTGTCTTG GAACAATAAA AGAAGAAACT CCAGCTTGGT CTACATTATT TCTTTTGTCT
1621 TTATATTAGT ATGGGTGTGT TCAGTTTCTT ATTTTAAAG GTACCCTGAA AGATAAAGGG
1681 CTATATAAAC CAGTGAGACT TTTTATTGGT TGCAAGGTTT TAGATCAAGC CATAAGACAG
1741 CATATTTTAT TCAAAAAAAA AAAAAA

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SEQ. ID. NO. 204

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1 MDIQSSPFNL IALLLFISFL FILLKKWNTK IPKLPPGPWR LPLIGSLHHL KGKLPHHHLR
61 DLARKYGPLM YLQLGEVPV VISSPRIAKA VLKTHDLAFA TRPRFMSSDI VFYKSRDISF
121 APYGDYWRQM RKILTQELLS NKMLKSFSTI RKDELSKLLS SIRLATASSA VNINEKLLWF
181 TSCMTCRLAF GKICNDRDEL IMLIREILAL SGGFDVCDLF PSWKLLHNMS NMKARLTNVH
241 HKYNLIMENI INEHKENHAA GIKGNNEFGG EDMIDALLRV KENNELQFPI ENDNMKAVIL
301 DLFIAGTETS YTAIIWALSE LMKHPSVMK AQAEVRKVFK ENENLDENDL DKLPYLKSVI
361 KETLRMHPPV PLLGPREFRE QTEIDGYTVP LKARVMVNAW AIGRDPESWE DPESFKPERF
421 ENISVDLTGN HYQFIPFGSG RRMCPGMSFG LVNTGHPLAQ LLYFFDWKFP HKVNAADFHT
481 TETSRVFAAS KDDLILPTN HMEQE

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FIG. 103

NAME D207-AB4  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 205

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1  AACCAACCTT CCTTTTCTTA CTTAGTAAAA TGGATATTCA GTCTTCTCCT TTCAACTTAA
61 TTGCTTTGCT ACTCTTCATT TCATTTCTTT TTATCCTATT GAAAAAGTGG AATACCAAAA
121 TCCCAAAGTT ACCTCCAGGT CCATGGAGAC TTCCCCTTAT TGGCAGCCTC CATCACTTGA
181 AAGGTAAACT CCCACACCAT CATCTTAGAG ATTTAGCCCG AAAATATGGA CCTCTCATGT
241 ATTTACAAC TGGAGAAGTT CCTGTAGTTG TAATATCTTC GCCACGTATA GCAAAAGCTG
301 TACTAAAAAC TCATGATCTT GCTTTTGCAA CGAGGCCTCG GTTCATGTCC TCGGACATTG
361 TGTTTTACAA AAGCAGGGAC ATATCATTCG CCCCATATGG CGATTACTGG AGACAAATGC
421 GTAAAATATT AACACAAGAA CTCTTGAGTA ACAAGATGCT CAAGTCATTT AGCACAATCC
481 GAAAGGATGG GCTCTCGAAG CTCCTCTCGT CGATTTCGTT AGCAACAGCT TCTTCTGCAG
541 TGAACATAAA CGAAAAGCTT CTCTGGTTTA CAAGTTGCAT GACTTGTAGA TTAGCCTTTG
601 GAAAAATATG CAACGATCGT GATGAATTGA TTATGTTAAT AAGGGAGATA TTAGCATTAT
661 CAGGAGGATT TGATGTGTGT GATTTGTTCC CTTTCATGGAA ATTACTTCAC AATATGAGCA
721 ACATGAAAGC TAGATTGACG AATGTTACC ATAAGTATAA TCTAATTATG GAGAATATCA
781 TCAATGAGCA CAAAGAGAAT CATGCAGCAG GGATAAAGG AAATAACGAG TTTGGTGGCG
841 AAGATATGAT TGATGCTTTA CTGAGGGTTA AGGAGAATAA TGAGCTTCAA TTTCTTATCG
901 AAAATGACAA CATGAAAGCA GTAATTCTGG ACTTGTTTAT TGCTGGAAC GAAACTTCAT
961 ATACTGCAAT TATATGGGCA CTATCAGAAT TGATGAAGCA CCCAAGTGTT ATGGCCAAGG
1021 CACAAGCTGA AGTGAGAAAA GTCTTCAAAG AAAATGAAAA CTTGGACGAA AATGATCTTG
1081 ACAAGTTGCC ATACTTAAAA TCAGTGATCA AAGAAACACT AAGGATGCAT CCTCCAGTTC
1141 CTTTATTAGG ACCTAGAGAA TGCAGAGAAC AAAGTGAGAT TGATGGATAT ACTGTACCTC
1201 TTAAAGCTAG AGTAATGGTT AATGCATGGG CAATTGGAAG AGATCCTGAA AGTTGGGAAG
1261 ATCCTGAAAG TTTCAAACCC GAGCGATTTC AAAATATTTT TGTTGATCTT ACGGGAAATC
1321 ACTATCAGTT CATTCCTTTC GGTTCAGGAA GAAGAATGTG TCCAGGAATG TCGTTTGGTT
1381 TAGTTAACAC TGGGCATCCT TTAGCTCAGT TGCTCTATTT CTTTGACTGG AAATTCCCTC
1441 ATAAGGTTAA TGCAGCTGAT TTTCACACTA CTGAAACAAG TAGAGTTTTT GCAGCAAGCA
1501 AAGATGACCT CTACTTGATT CCAACAAATC ACATGGAGCA AGAGTAGCTC TAAATTGAAT
1561 TCTTGTCTTG GAACGATAAA AGAAGAAACT CCAGCTTGGT CTACATTATT TCTTTTTGCT
1621 TTATATTAGT ATGGGTGTGT TCAGTTTCTT GTTTTAAAGG GTACCCTGAA AGATAAAGGG
1681 CTATATAAAC CAGTGAGACT TTTTATTGAA AAAAAAAAAA AAAAAAAAAA AAAAAA

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SEQ. ID. NO. 206

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1  MDIQSSPFNL IALLLFISFL FILLKKWNTK IPKLPPGPWR LPLIGSLHHL KGKLPHHHLR
61 DLARKYGPLM YLQLGEVPV VISSPRIAKA VLKTHDLAFA TRPRFMSSDI VFYKSRDISF
121 APYGDYWRQM RKILTQELLS NKMLKSFSTI RKDELSKLLS SIRLATASSA VNINEKLLWF
181 TSCMTCRLAF GKICNDRDEL IMLIREILAL SGGFDVCDLF PSWKLLHNMS NMKARLTNVH
241 HKYNLIMENI INEHKENHAA GIKGNNEFGG EDMIDALLRV KENNELQFPI ENDNMKAVIL
301 DLFIAGTETS YTAIIWALSE LMKHPSVMAK AQAEVRKVFK ENENLDENDL DKLPYLKSVI
361 KETLRMHPPV PLLGPRECRE QTEIDGYTVP LKARVMVNAW AIGRDPESWE DPESFKPERF
421 ENISVDLTGN HYQFIPFGSG RRMCPGMSFG LVNTGHPLAQ LLYLFDWKFP HKVNAADFHT
481 TETSRVFAAS KDDLILPTN HMEQE

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FIG. 104

45/111

NAME D207-AC4  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 207

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1 AACCAACCTT CCTTTTCTTA CTTAGTAAAA TGGATATTCA GTCTTCTCCT TTCAACTTAA
61 TTGCTTTGCT ACTCTTCATT TCATTTCTTT TTATCCTATT GAAAAAGTGG AATACCAAAA
121 TCCCAAAGTT ACCTCCAGGT CCATGGAGAC TTCCCCTTAT TGGCAGCCTC CATCACTTGA
181 AAGGTAAACT CCCACACCAT CATCTTAGAG ATTTAGCCCG AAAATATGGA CCTCTCATGT
241 ATTTACAAC TGGAGAAGTT CCTGTAGTTG TAATATCTTC GCCACGTATA GCAAAAGCTG
301 TACTAAAAAC TCATGATCTT GCTTTTGCAA CGAGGCCTCG GTTCATGTCC TCGGACATTG
361 TGTTTTACAA AAGCAGGGAC ATATCATTCG CCCCATATGG CGATTACTGG AGACAAATGC
421 GTAAAATATT AACACAAGAA CTCTTGAGTA ACAAGATGCT CAAGTCATTT AGCACAATCC
481 GAAAGGATGA GCTCTCGAAG CTCCTCTCGT CGATTCGTTT AGCAACAGCT TCTTCTGCAG
541 TGAACATAAA CGAAAAGCTT CTCTGGTTTA CAAGTTGCAT GACTTGTAAG TTAGCCTTTG
601 GAAAAATATG CAACGATCGT GATGAATTGA TTATGTTAAT AAGGGAGATA TTAGCATTAT
661 CAGGAGGATT TGATGTGTGT GATTTGTTCC CTTTCATGGAA ATTACTTCAC AATATGAGCA
721 ACATGAAAGC TAGATTGACG AATGTTCCACC ATAAGTATAA TCTAATTATG GAGAATATCA
781 TCAATGAGCA CAAAGAGAAT CATGCAGCAG GGATAAAGGG AAATAACGAG TTTGGTGGCG
841 AAGATATGAT TGATGCTTTA CTGAGGGTTA AGGAGAATAA TGAGCTTCAA TTTCTTATCG
901 AAAATGACAA CATGAAAGCA GTAATTCCTGG ACTTGTTTAT TGCTGGAAC TAACTTCAT
961 ATACTGCAAT TATATGGGCA CTATCAGAAT TGATGAAGCA CCCAAGTGTT ATGGCCAAGG
1021 CACAAGCTGA AGTGAGAAAA GTCTTCAAAG AAAATGAAAA CTGGACGAA AATGATCTTG
1081 ACAAGTTGCC ATAATTAAAA TCAGTGATCA AAGAAACACT AAGGATGCAT CCTCCAGTTC
1141 CTTTATTAGG ACCTAGAGAA TGCAGAGAAC AAAGTGAAT TGATGGATAT ACTGTACCTC
1201 TTAAAGCTAG AGTAATGGTT AATGCATGGG CAATTGGAAG AGATCCTGAA AGTTGGGAAG
1261 ATCCTGAAAG TTTCAAACCC GAGCGATTG AAAATATTTT TGTTGATCTT ACGGGAAATC
1321 ACTATCAGTT CATTCCTTTC GGTTCAGGAA GAAGAATGTG TCCAGGAATG TCGTTTGGTT
1381 TAGTTAACAC TGGGCATCCT TTAGCTCAGT TGCTCTATCT CTTTGACTGG AAATTCCCTC
1441 ATAAGGTTAA TGCAGCTGAT TTTTCACTA CTGAAACAAG TAGAGTTTTT GCAGCAAGCA
1501 AAGATGACCT CTACTTGATT CCAACAAATC ACATGGAGCA AGAGTAGCTC TAAATTGAAT
1561 TCTTGTCTTG GAACAATAAA AGAAGAAACT CCAGCTTGGT CTACATTATT TCCTTTTGCT
1621 TTATATTAGT ATGGGTGTGT TCAGTCTCTT GTTTTAAAGG GTACCCTGAA AGATAAAGGG
1681 CTATATAAAC CAGTGAGACT TTTTATTGGT TGCAAGGTTT TAGATCAAGC CATAAGACAG
1741 CATATTTTAT TCCACCATT TCTATCATGT TTAATAAAGT TCCTTTCGTT TATTGTTAGA
1801 AAAAAAAAAA AAAAAAAAAA AAA

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SEQ. ID. NO. 208

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1 MDIQSSPFNL IALLLFISFL FILLKKWNTK IPKLPPGPWR LPLIGSLHHL KGKLPHHHLR
61 DLARKYGPLM YLQLGEVPV VISSPRIAKA VLKTHDLAFA TRPRFMSSDI VFYKSRDISF
121 APYGDYWRQM RKILTQELLS NKMLKSFSSTI RKDELSKLLS SIRLATASSA VNINEKLLWF
181 TSCMTCRLAF GKICNDRDEL IMLIREILAL SGGFDVCDLF PSWKLLHNMS NMKARLTNVH
241 HKYNLIMENI INEHKENHAA GIKGNNEFGG EDMIDALLRV KENNELQFPI ENDNMKAVIL
301 DLFIAGTETS YTAIIWALSE LMKHPSVMAK AQAEVRKVFK ENENLDENDL DKLPYLKSVI
361 KETLRMHPPV PLLGPRECRE QTEIDGYTVP LKARVMVNAW AIGRDPESWE DPESFKPERF
421 ENISVDLTGN HYQFIPFGSG RRMCPGMSFG LVNTGHPLAQ LLYLFDWKFP HKVNAADFHT
481 TETSRVFAAS KDDLILIPTN HMEQE

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FIG. 105

NAME D209-AA10  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 209

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1 ATATGCAACT GAGATTTGAA GAATACCAAC TAACCAAAAT GCAGTTCTTC AGCCTGGTTT
61 CCATTTTCCT ATTTCTATCT TTCCTCTTTT TGTTAAGGGT ATGGAAGAAC TCCAATAGCC
121 AAAGCAAAAA GTTGCCACCA GGTCCATGGA AACTACCAAT ACTAGGAAGT ATGCTTCATA
181 TGGTTGGTGG ATTACACAC CATGTCCTTA GAGATTTAGC CAAAAAATAT GGACCACTTA
241 TGCACCTTCA ATTAGGTGAA GTTCTGCGG TTGTGGTTAC TTCTCCTGAT ACGGCAAAAG
301 AAGTATTAAA AACTCATGAC ATCGCTTTTG CGTCTAGGCC TAGCCTTTTG GCCCGGAGA
361 TTGTCTGTTA CAATAGGTCT GATCTAGCCT TTTGCCCCCTA TGGCGACTAT TGGAGACAAA
421 TGCCTAAAAT ATGTGTCTTG GAAGTGCTCA GTGCCAAGAA TGTCGGACA TTTAGCTCTA
481 TTAGGCGGAA TGAAGTCTT CGTCTCATT ATTTTATCCG GTCATCTTCT GGTGAACCTA
541 TTAATGTTAC GGAAGGATC TTTTGTTC CAAGCTCCAT GACATGTAGA TCAGCGTTTG
601 GGCAAGTGTT CAAAGAGCAA GACAAATTTA TACAATAAT TAAAGAAGTG ATACTCTTAG
661 CAGGAGGGTT TGATGTGGCT GACATATTCC CTTCACTGAA GTTCTTCAT GTGCTCAGTG
721 GAATGAAGGG TAAGATTATG AATGCACACC ATAAGGTAGA TGCCATTGTT GAGAATGTCA
781 TCAATGAGCA CAAGAAAAAT CTTGCAATTG GGAAAACTAA TGGAGCGTTA GGAGGTGAAG
841 ATTTAATTGA TGTCTTCTA AGACTTATGA ATGATGGAGG CTTCAATTT CCTATCACCA
901 ACGACAACAT CAAAGCTATA ATTTTGTACA TGTGTGCTGC CGGGACAGAG ACTTCATCGT
961 CAACAATTGT GTGGGCTATG GTAGAAATGG TGAAAAATCC AGCCGTATTC GCGAAAGCTC
1021 AAGCAGAAGT AAGAGAAGCA TTTAGAGGAA AAGAACTTT CGATGAAAAT GATGTGGAGG
1081 AGCTAAACTA CCTAAAGTTA GTAATAAAG AAACCTAAG ACTTCATCCA CCGGTTCCAC
1141 TTTTGCTCCC AAGAGAATGT AGGGAAGAGA CAAATATAAA CGGCTACACT ATTCCTGTAA
1201 AGACCAAAGT CATGGTTAAT GTTTGGGCTT TGGGAAGAGA TCCAAAATAT TGGGAATGACG
1261 CAGAACTTT TATGCCAGAG AGATTTGAGC AGTGCTCTAA GGATTTTGTT GGTAAATAAT
1321 TTGAATATCT TCCATTTGGT GCGGGAAGGA GGATTTGTCC TGGGATTTCT TTTGGCTTAG
1381 CTAATGCTTA TTTGCCATTG GCTCAATTAC TATATCACTT CGATTGGAAA CTCCCTGCTG
1441 GAATCGAACC AAGCGACTTG GACTTGACTG AGTTGGTTGG AGTAACTGCC GCTAGAAAAA
1501 GTGACCTTTA CTTGGTTGCG ACTCCTTATC AACCTCCTCA AAAGTGATTT AATGGTTTCA
1561 AGTTTTTATT TCCTAGCAAA CCCCCTATT GTCCTATCTT TCTTTTGGTG TTTTCGGTTT
1621 TATCTACTCT AATACATGCA TCTTTTACCA TATAGGAATG TACCATGTTG TCG

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SEQ. ID. NO. 210

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1 MQLRFEEYQL TKMQFFSLVS IFLFLSFLFL LRVWKNNSQ SKKLPPGPWK LPILGSMLHM
61 VGGLPHHVLR DLAKKYGPLM HLQLGEVSAV VVTSPDTAKE VLKTHDIAFA SRPSLLAPEI
121 VCYNRSDLAF CPYGDYWRQM RKICVLEVL AKNVRTFSSI RRNEVLR LIN FIRSSSGEPI
181 NVTERIFLFT SSMTCSRSAFG QVFKEQDKFI QLIKEVILLA GGFVDVADIFP SLKFLHVLSG
241 MKGKIMNAHH KVDAIVENVI NEHKKNLAIK KTNALGGED LIDVLLRLMN DGGQFPITN
301 DNIKAIIFDM FAAGTETSSS TIVWAMVEMV KNPVFAKAQ AEVREAFRGK ETFDENDVEE
361 LNYLKLVIKE TLRLHPPVPL LLPRECREET NINGYTIPVK TKVMNVWAL GRDPKYWNDA
421 ETFMPEFEQ CSKDFVGNNF EYLPFGGRR ICPGISFGLA NAYLPLAQLL YHFDWKLPAG
481 IEPDLDLTE LVGVTAARKS DLYLVATPYQ PPQK

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FIG. 106

47/111

NAME D209-AA12  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 211

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1 ATATGCAACT GAGATTTGAA GAATACCAAC TAACCAAAAT GCAGTTCTTC AGCTTGTTTT
61 CCATTTTCCT ATTTCTATCT TTCCTCTTTT TGTTAAGGAT ATGGAAGAAC TCCAATAGCC
121 AAAGCAAAA GTTGCCACCA GGTCCATGGA AACTACCAAT ACTAGGAAGT ATGCTTCATA
181 TGGTTGGTGG ACTACCACAC CATGTCCTTA GAGATTTAGC CAAAAAATAT GGACCACTTA
241 TGCACCTTCA ATTAGGTGAA GTTCTGCGG TTGTGGTTAC TTCTCCTGAT ACGGCAAAAG
301 AAGTATTAAT AACTCATGAC ATCGCTTTTG CGTCTAGGCC TAGCCTTTTG GCCCCGGAGA
361 TTGTCTGTTA CAATAGGTCT GATCTAGCCT TTTGCCCCCTA TGGCGACTAT TGGAGACAAA
421 TGCGTAAAAT ATGTGTCTTG GAAGTGCTCA GTGCCAAGAA TGTTCGGACA TTTAGCTCTA
481 TTAGGCGGAA TGAAGTTCTT CGTCTCATTA ATTTTATCCG GTCATCTTCT GGTGAACCTA
541 TTAATGTTAC GGAAAGGATC TTTTGTGTTA CAAGCTCCAT GACATGTAGA TCAGCGTTTG
601 GGCAAGTGTT CAAAGAGCAA GACAAATTTA TACAATAAT TAAAGAAGTG ATACTCTTAG
661 CAGGAGGGTT TGATGTGGCT GACATATTCC CTTCACTGAA GTTCTTCAT GTGCTCAGTG
721 GAATGAAGGG TAAGATTATG AATGCACACC ATAAGGTAGA TGCCATTGTT GAGAATGTCA
781 TCAATGAGCA CAAGAAAAAT CTGCAATTG GGAAACTAA TGGAGCGTTA GGAGGTGAAG
841 ATTTAATTGA TGTCTTCTA AGACTTATGA ATGATGGAGG CCTTCAATTT CCTATCACCA
901 ACGACAACAT CAAAGCCATA ATTTTGTGACA TGTTTGCTGC CGGGACAGAG ACTTCATCGT
961 CAACAATTGT GTGGGCTATG GTAGAAATGG TGAAAAATCC AGCCGTATTC GCGAAAGCTC
1021 AAGCAGAAGT AAGAGAAGCA TTTAGAGGAA AAGAACTTT CGATGAAAAT GATGTGGAGG
1081 AGCTAAACTA CCTAAAGTTA GTAATAAAG AACTCTAAG ACTTCATCCA CCGGTCCAC
1141 TTTTGCTCCC AAGAGAAATG AGGGAAGAGA CAAATATAAA CGGCTACACT ATTCCTGTAA
1201 AGACCAAAGT CATGGTTAAT GTTTGGGCTT TGGGAAGAGA TCCAAAATAT TGGAAATGACG
1261 CAGAAACTTT TATGCCAGAG AGATTTGAGC AGTGCTCTAA GGATTTTGTT GGTAATAATT
1321 TTGAATATCT TCCATTGGT GCGGGAAGGA GGATTTGTCC TGGGATTTG TTTGGCTTAG
1381 CTAATGCTTA TTTGCCATTG GCTCAATTAC TATATCACTT CGATTGGAAA CTCCCTGCTG
1441 GAATCGAACC AAGCGACTTG GACTTGACTG AGTTGGTTGG AGTAAGTACC GCTAGAAAAA
1501 GTGACCTTTA CTTGGTTGCG ACTCCTTATC AACCTCCTCA AAAGTGATTT AATGGTTTCA
1561 AGTTTTTATT TCCTAGCAAA CCCCCTATT GTCCTATCTT TCTTTTGGTG TTTTCGGTTT
1621 TATCTACTCT AATACATGCA TCTTTTACCA TATAGGAATG TACCATGTTG TCG

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SEQ. ID. NO. 212

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1 MQLRFEEYQL TKMQFFSLVS IFLFLSFLFL LRIWKNSNSQ SKKLPPGPWK LPILGSMMLHM
61 VGGLPHHVLR DLAKKYGPLM HLQLGEVSAV VVTSPDTAKE VLKTHDIAFA SRPSLLAPEI
121 VCYNRSDLAF CPYGDYWRQM RKICVLEVL AKNVRTFSSI RRNEVLRLIN FIRSSSGEPI
181 NVTERIFLFT SSMTCRSAFG QVFEQDKFI QLIKEVILLA GGFDVADIFP SLKFLHVLG
241 MKGKIMNAHH KVDAIVENVI NEHKKNLAIG KTNALGGED LIDVLLRLMN DGGLQFPITN
301 DNIKAIIFDM FAAGTETSSS TIVWAMVEMV KNPVFAKAQ AEVREAFRGK ETFDENDVEE
361 LNYLKLVIKE TLRHPPVPL LLPRECREET NINGYTI PVK TKVMNVWAL GRDPKYWDA
421 ETETPERFEQ CSKDFVGNF EYLPFGGRR ICPGISFGLA NAYLPLAQLL YHFDWKLPG
481 IEPDLDLTE LVGVTAARKS DLYLVATPYQ PPQK

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FIG. 107

48/111

NAME D209-AH10  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 213

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1 ATATGCAACT GAGATTTGAA GAATACCAAC TAACCAAAGT GCAGTTCTTC AGCTTGGTTC
61 CCATTTTCCT ATTTCTATCT TTCCTCTTTT TGTTAAGGAT ATGGAAGAAC TCCAATAGCC
121 AAAGCAAAAA GTTGCCACCA GGTCCATGGA AACTACCAAT ACTAGGAAGT ATGCTTCATA
181 TGGTTGGTGG ACTACCACAC CATGTCCTTA GAGATTTAGC CAAAAAATAT GGACCACTTA
241 TGCACCTTCA ATTAGGTGAA GTTTCTGCGG TTGTGGTTAC TTCTCCTGAT ACGGCAAAAG
301 AAGTATTAAA AACTCATGAC ATCGCTTTTG CGTCTAGGCC TAGCCTTTTG GCCCCGGAGA
361 TTGTCTGTTA CAATAGGTCT GATCTAGCCT TTTGCCCTTA TGGCGACTAT TGGAGACAAA
421 TGCCTAAAAT ATGTGTCTTG GAAGTGCTCA GTGCCAAGAA TGTTCCGACA TTTAGCTCTA
481 TTAGGCGGAA TGAAGTTCCT CGTCTCATTA ATTTTATCCG GTCATCTTCT GGTGAACCTA
541 TTAATGTTAC GGAAAGGATC TTTTGTGTTCA CAAGCTCCAT GACATGTAGA TCAGCGTTTG
601 GGCAAGTGTT CAAAGAGCAA GACAAATTTA TACAACAAAT TAAAGAAGTG ATACTCTTAG
661 CAGGAGGGTT TGATGTGGCT GACATATTCC CTTCACTGAA GTTTCCTTCAT GTGCTCAGTG
721 GAATGAAGGG TAAGATTATG AATGCACACC ATAAGGTAGA TGCCATTGTT GAGAATGTCA
781 TCAATGAGCA CAAGAAAAAT CTTGCAATTG GGAAAACTAA TGGAGCGTTA GGAGGTGAAG
841 ATTTAATTGA TGTTCTCTTA AGACTTATGA ATGATGGAGG CCTTCAATTT CCTATCACCA
901 ACGACAACAT CAAAGCTATA ATTTTGTGACA GTCTTGCTGC CGGGACGGAG ACTTCATCGT
961 CAACAATTGT GTGGGCTATG GTAGAAATGG TGAAAAATCC AGCCGTATTC GCGAAAGCTC
1021 AAGCAGAAGT AAGAGAAGCA TTTAGAGGAA AAGAACTTT CGATGAAAAT GATGTGGAGG
1081 AGCTAAACTA CCTAAAGTTA GTAATAAAAG AAACCTCTAAG ACTTCATCCA CCGGTTCCAC
1141 TTTTGCTCCC AAGAGAATGT AGGGAAGAGA CAAATATAAA CGGCTACACT ATTCCTGTAA
1201 AGACCAAAGT CATGGTTAAT GTTTGGGCTT TGGGAAGAGA TCCAAAATAT TGGAATGACG
1261 CAGAACTTTT TATGCCAGAG AGATTTGAGC AGTGCTCTAA GGATTTTGTT GGTAAATAAT
1321 TTGAATATCT TCCATTGGT GGCAGGAAGG GGATTTGTCC TGGGATTTTC TTTGGCTTAG
1381 CTAATGCTTA TTTGCCATTG GCTCAATTAC TATATCACTT CGATTGGAAG CTCCCTGCTG
1441 GAATCGAACC AAGCGACTTG GACTTGACTG AGTTGGTTGG AGTAACTGCC GCTAGAAAAA
1501 GTGACCTTTA CTTGGTTGCG ACTCCTTATC AACCTCCTCA AAAGTGATTT AATGGTTTCA
1561 AGTTTTTTAT TCCTAGCAAA CCCCCTATT GTCTATCTT TCTTTTGGTG TTTTCGGTTT
1621 TATCTACTCT AATACATGCA TCTTTTACCA TATAGGAATG TACCATGTTG TCG

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SEQ. ID. NO. 214

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1 MQLRFEEYQL TKVQFFSLVS IFLFLSFLFL LRIWKNSNSQ SKKLPPGPWK LPILGSM LHM
61 VGGLPHHVLRL DLAKKYGPLM HLQLGEVSAV VVTSPDTAKE VLKTHDIAFA SRPSLLAPEI
121 VCYNRSDIAF CPYGDYWRQM RKICVLEVL AKNVRTFSSI RRNEVLRLIN FIRSSSGEPI
181 NVTERIFLFT SSMTCRSAFG QVFKEQDKFI QLIKEVILLA GGFVDVADIFP SLKFLHVLSSG
241 MKGKIMNAHH KVDAIVENVI NEHKKNLAIG KTNALGGED LIDVPLRLMN DGGLQFPITN
301 DNIKAIIFDM FAAGTETSSS TIVWAMVEMV KNPAVFKAQ AEVREAFRGK ETFDENDVEE
361 LNYLKLVIKE TLRLHPPVPL LLPRECREET NINGYTIPVK TKVMNVWAL GRDPKYWNDA
421 ETFMPPERFEQ CSKDFVGNNE EYLPFGGRR ICPGISFGLA NAYLPLAQLL YHFDWKLPAQ
481 IEPDLDLLE LVGVTAARKS DLYLVATPYQ PPQK

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FIG. 108

49/111

NAME D87A-AF3  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 215

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1  GAAATGGGAA ATGCTCACAA CAGCAAAATT GCAGCAATCT GTTTGATAAT TTTCTTGGTA
61 TATAAAGCAT GGGAAATTGTT GAAGTGGATA TGGATTAAGC CAAAGAAACT GGAGAGTTGC
121 CTCAGAAAAC AGGGACTCAA AGGAAATTCC TACAGGCTAT TCTATGGAGA TATGAAAGAA
181 TTGTCCAAAA GTCTCAAGGA AATCAATTCA AAGCCCATCA TCAATCTATC AAATGAAGTA
241 GCCCCAAGAA TCATTCCTTA TTATCTTGAA ATCATCCAAA AATATGGTAA AAGATGTTTT
301 GTTTGGCAAG GACCAACCCC CGCAATATTA ATAACAGAGC CAGAATTAAT AAAGGAGATA
361 TTTGGTAAGA ACTATGTTTT TCAGAAGCCT AATAATCCCA ACCCACTGAC CAAGTTATTG
421 GCTCGAGGTG TTGTAAGCTA CGAGGAAGAA AAATGGGCAA AACACAGAAA GATCTTAAAC
481 CCTGCCTTTC ATATGGAGAA GTTGAAGCAT ATGCTACCAG CATTTTACTT GAGCTGTAGT
541 GAGATGCTGA ACAAATGGGA GGAGATTATC CCAGTAAAAG AATCAAATGA GTTGGACATT
601 TGGCCTCATC TTCAAAGAAT GACAAGTGAT GTGATTTCTC GTGCTGCCTT TGGTAGTAGC
661 TACGAAGAAG GAAGAAGAAT ATTTGAACTT CAAGAAGAAC AAGCTGAGTA TCTAACGAAG
721 ACATTCAATT CAGTTTATAT CCCAGGTTCC AGATTTTTTC CCAATAAAAT GAACAAAAGA
781 ATGAAAGAAT GTGAAAAGGA AGTACGAGAA ACAATTACGT GTCTAATTGA CAACAGATTA
841 AAGGCAAAAG AAGAAGGCAA TGGCAAGGCC CTCAATGATG ACCTACTGGG TATATTATTA
901 GAGTCAAATT CTATAGAAAT TGAAGAACAT GGTAACAAGA AGTTTGGAAT GAGTATACCT
961 GAAGTAATTG AAGAGTGCAA ATTATTCTAT TTTGCTGGCC AAGAGACTAC ATCAGTATTG
1021 CTTGTGTGGA CACTGATTTT GTTAGGGAGA AATCCAGAAT GGCAGGAACG TGCTAGAGAG
1081 GAAGTTTTTC AAGCCTTTGG AAGTGATAAA CCACTTTTGG ACGAATTATA TCGCTTGAAA
1141 ATTGTGACGA TGATTTTGTA CGAGTCTTTA AGGTTATATC CACCAATAGC AACTCGTACT
1201 CGAAGGACTA ATGAAGAAAC AAAATTAGGG GAAC TAGATT TACCAAAGGG TGCACTGCTC
1261 TTTATACCAA CAATCTTATT ACATCTTGAC AAGGAAATTT GGGGTGAAGA TGCAGATGAG
1321 TTCAATCCGG AGAGATTTAG CGAAGGGGTG GCAAAGGCAA CAAAGGGGAA AATGACATAT
1381 TTTCCATTTG GTGCAGGACC GCGAAAATGC ATTGGGCAAA ACTTCGCGAT TTTGGAAGCA
1441 AAAATGGCTA TAGCTATGAT TCTACAACGC TTCTCCTTCG AGCTCTCTCC ATCTTATACA
1501 CACTCTCCAT ACACTGTGGT CACTTTGAAA CCCAAATATG GTGCTCCCCT AATAATGCAC
1561 AGGCTGTAGT CCTGTGAGAA

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SEQ. ID. NO. 216

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1  MGNHNSKIA AICLIIFLVY KAWELLKWIW IKPKKLESCL RKQGLKGSY RLFYGD MKEL
61  SKSLKEINSK PIINLSNEVA PRIIPYYLEI IQKYGKRCFV WQGPTPAILI TEPELIKEIF
121 GKNYVFQKPN NPNPLTKLLA RGVVSYYYYE WAKHRKILNP AFHMEKLKHM LPAFYLSLSE
181 MLNKWEEIIP VKESNELDIW PHLQRM TSDV ISRAAFGSSY EGRRI FELQ EEQAEYLT KT
241 FNSVYIPGSR FFPNKMNMKRM KECEKEVRET ITCLIDNRLK AKEEGNGKAL NDDL LGILLE
301 SNSIEIEEHG NKKFGMSIPE VIEECKLFYF AGQETTSVLL VWTLLILGRN PEWQERAREE
361 VFQAFGSDKP TFDLYRLKI VTMILYESLR LYPPIATRTR RTNEETKLGE LDLPKGALLF
421 IPTILLHLDK EIWGEDADEF NPERFSEGVA KATKGKMTYF PFGAGPRKCI GQNF AILEAK
481 MAIAMILQRF SFELSPSYTH SPYTVVTLKP KYGAPLIMHR L

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FIG. 109

50/111

NAME D208-AC8  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 217

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1 ATGCTTTCTC CCATAGAAGC CTTTGTAGGA CTAGTAACCT TCACATTTCT CTTATACTTC
61 CTATGGACAA AAAAATCTCA AAAACTTCCA AAACCCCTAC CACCGAAAAT CCCCGGAGGA
121 TGGCCGGTAA TCGGCCATCT TTTTCACTTC AATAACGACG GCGACGACCG TCCATTAGCT
181 CGAAAGCTCG GAGACTTAGC TGATAAATAC GGCCCCGTTT TCACTTTTTCG GCTAGGTCTT
241 CCCCTTGTGC TAGTTGTAAG CAGTTACGAA GCTATAAAAG ATTGCTTCTC TACAAATGAT
301 GCCATTTTCT CCAATCGTCC AGCTCTTCTT TACGGCGAAT ACCTTGGCTA CAATAATACA
361 ATGCTTTTTC TAGCAAATTA CGGACCTTAC TGGCGAAAAA ATCGTAAATT AGTCATTAGC
421 GAAGTTCTCT CTGCTAGTCG TCTCGAAAAA TTCAAACAAG TGAGATTCAC CAGAATTCAA
481 ACGAGCATTA AGAATTTATA CACTCGAATT AATGGAAATT CGAGTACGAT AAATCTAACT
541 GATTGGTTAG AAGAATTGAA TTTTGGTCTG ATCGTGAAAA TGATCGCTGG GAAAAATTAT
601 GAATCCGGTA AAGGAGATGA ACAAGTGGA AGATTTAAGA ATGCGTTTAA GGATTTTATG
661 GTTTTATCAA TGGAAATTTGT ATTATGGGAT GCATTTCCAA TTCCATTATT TAAATGGGTG
721 GATTTTCAAG GTCATATTAA GGCAATGAAA AGGACATTTA AGGATATAGA TTCTGTTTTT
781 CAGAACTGGT TAGAGGAACA TATTAATAAA AGAGAAAAAA TAGAGGTTGG TGCAGAAGGG
841 AATGAACAAG ATTTTCATTGA TGTGGTGCTT TCAAAATTGA GTAAAGAATA TCTTGATGAA
901 GGTTACTCTC GTGATACTGT CATTAAAGCA ACAGTTTTTA GTTTGGTCTT GGATGCAGCA
961 GACACAGTTG CTCTTCACAT AAATTGGGGA ATGACATTAT TGATAAACAA TCAAAATGCC
1021 TTGATGAAAG CACAAGAAGA GATAGACACA AAAGTTGGTA AGGATAGATG GGTAGAAGAG
1081 AGTGATATTA AGGATTTAGT ATACCTCCAA GCTATTGTTA AAAAGGTGTT ACGATTATAT
1141 CCACCAGGAC CTTTGTTAGT ACCACATGAA AATGTAAAGG ATTGTGTTGT TAGTGGATAT
1201 CACATTCCTA AAGGGACTAG ATTATTGCGA AACGTCATGA AACTGCAGCG CGATCCTAAA
1261 CTCTTGTCAT ATCCTGATAA GTTCGATCCA GAGAGATTCA TCGCTGGTGA TATTGACTTC
1321 CGTGGTCACC ACTATGAGTT TATCCCATT TGGTCTGGAA GACGATCTTG TCCGGGGATG
1381 ACTTATGCAT TGCAAGTGGA ACACCTAACA ATGGCACATT TAATCCAGGG TTTCAATTAC
1441 AAAACTCCAA ATGACGAGGC CTTGGATATG AAGGAAGGTG CAGGCATAAC AATACGTAAG
1501 GTAAATCCAG TGGAAATTGAT AATAACGCCT CGCTTGGCAC CTGAGCTTTA CTAAAACCTA
1561 AGATGTTTCA TCTTGTTTGA TCATTGT

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SEQ. ID. NO. 218

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1 MLSPIEAFVG LVTFTFLLYF LWTKKSQKLP KPLPPKIPGG WPVIGHLFHF NNDGDDRPLA
61 RKLGLDADKY GPVFTFRLGL PLVLVVSSYE AIKDCFSTND AIFSNRPALL YGEYLGYNNT
121 MLFLANYGPY WRKNRKLVIQ EVLSASRLEK FKQVRFTRI TSIGNLYTRI NGNSSTINLT
181 DWLEELNFGI IVKMIAGKNY ESGKGDEQVE RFKNAFKDFM VLSMEFVLWD AFPIPLFKWV
241 DFQGHKAMK RTFKDIDSVF QNWLEEHINK REKIEVGAEG NEQDFIDVVL SKLSKEYLDE
301 GYSRDTVICA TVFSLVLDA DTVALHINWG MTLINNNQNA LMKAQEEIDT KVGKDRWVEE
361 SDIKDLVYLQ AIVKKVLRLY PPGPLLPHE NVKDCVVSFY HIPKGTRLF NVMKLQRPK
421 LLSNPDKFD ERFIAGDIDF RGHHYEFIPF GSGRRSCPGM TYALQVEHLT MAHLIQGFNY
481 KTPNDEALDM KEGAGITIRK VNPVELIITP RLAPELY

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FIG. 110

NAME D215-AB5  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 219

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1 GGGAGAAGGC CTTCAATATG GAGATACCAT ATTACAGCTT AAAAAATTGCA ATTTCTTCAT
61 TTGCAATTAT CTTTGTACTA AGATGGGCAT GGAAAATCTT GAATTATGTG TGGTTAAAAC
121 CAAAAGAATT GGAGAAATAC CTCAGACAGC AGGGTTTCAA AGGAACTCT TACAAATTCT
181 TGTTTGGGGA TATGAAAGAG ACGAAGAAAA TGGGTGAAGA AGCTATGTCT AAGCCAATCA
241 ATTTCTCTCA TGACATGATT TGGCCTAGAG TTATGCCATT CATCCACAAA ACCATCACCA
301 ATTATGGTAA GAATTGTATT GTGTGGTTTG GGCCAAGACC AGCAGTCCTG ATCACAGACC
361 CGGAACCTTG AAAGGAGGTG CTAACGAAGA ATTTTCGTCTA TCAGAAGCCG CTTGGCAATC
421 CACTCACAAA GTTGGCAGCA ACTGGAATTG CAGGCTATGA AACAGATAAA TGGGCTACAC
481 ATAGAAGGCT TCTCAATCCT GCTTTTCACC TTGACAAGTT GAAGCATATG CTACCTGCAT
541 TCCAATTTAC TGCTAGTGAG ATGTTGAGCA AATTGGAGAA AGTTGTTTCA CCAAACGGAA
601 CAGAGATAGA TGTGTGGCCA TATTTACAAA CTTTGACAAG TGATGCCATT TCAAGAAGTG
661 CGTTTGGGAG TAGTTATGAA GAAGGAAGAA AGATTTTGA CCTTCAAAA GAACAACCTT
721 CACTAATTCT AGAAGTTTCA CGCACAATAT ATATTCCAGG ATGGAGGTTT TTGCCAACGA
781 AAAGGAACAA AAGGATGAAG CAAATATTTA ATGAAGTACG AGCACTGGTA TTTGGAATTA
841 TTAAGAAAAG GATGAGTATG ATTGAAAATG GAGAAGCACC TGATGATTTA TTGGGAATAT
901 TATTGGCATC CAATTTAAAA GAAATCCAAC AACATGGAAA CAACAAGAAA TTTGGTATGA
961 GTATTGATGA GGTGATTGAA GAGTGTAAC TCTTCTATTT TGCTGGGCAA GAGACTACTT
1021 CATCTTTACT TGTATGGACT ATGATTTTGT TGTGCAAATA TCCTAATTGG CAAGATAAAG
1081 CTAGAGAAGA GGTTTTGCAA GTGTTTGGGA GTAGGGAAGT TGACTATGAC AAGTTGAATC
1141 AGCTAAAAAT AGTAACTATG ATCTTAAACG AGGTCTTAAG GTTGTATCCA GCAGGATATG
1201 TGATTAATCG AATGGTAAAC AAAGAAACAA AGTTAGGGAA TTTGTGTTTA CCAGCCGGCG
1261 TACAGCTCGT GTTACCAACA ATGTTGTTGC AACATGATAC TGAAATATGG GGAGATGATG
1321 CAATGGAGTT CAATCCAGAG AGATTTAGTG ATGGAATATC CAAAGCAACA AAAGGAAAAC
1381 TTGTGTTTTT TCCATTTAGT TGGGGTCCAA GAATATGTAT TGGGCAAAAT TTTGCTATGT
1441 TAGAGGCTAA AATGGCAATG GCTATGATTC TGAAAACCTA TGCATTTGAA CTCTCTCCAT
1501 CTTATGCTCA TGCTCCTCAT CCACTACTAC TTCAACCTCA ATATGGTGCT CAATTAATTT
1561 TGTACAAGTT GTAGATATGG TCAATCTGGA ACTTGTTATG GAACTTTTAT CATCGTAATC
1621 AACCATATTG AGGG

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SEQ. ID. NO. 220

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1 MEIPYYSLSKI AISSFAIIFV LRWAWKILNY VWLKPKELEK YLRQQGFKN SYKFLFGDMK
61 ETKKMGEEM SKPINFSHDM IWPRVMPFIH KTITNYGKNC IVWFGPRPAV LITDPELVKE
121 VLTKNFVYQK PLGNPLTKLA ATGIAGYETD KWATHRRLLN PAFHLDKLLH MLPAFQFTAS
181 EMLSKLEKVV SPNGTEIDVW PYLQTLTSDA ISRTAFGSSY EEGRKIFDLQ KEQLSLILEV
241 SRTIYIPGWR FLPTKRNRKM KQIFNEVRAL VFGIIKKRMS MIENGEAPDD LLGILLASNL
301 KEIQQHGNK KFGMSIDEVI EECKLFYFAG QETTSSLLVW TMILLCKYPN WQDKAREEVL
361 QVFGSREVDY DKLNLQKIVT MILNEVLRLY PAGYVINRMV NKETKLGKLC LPAGVQLVLP
421 TMLLQHDTEI WGDDAMEFNP ERFSDGSKA TKGKLVFFPF SWGPRICIGQ NFAMLEAKMA
481 MAMILKTYAF ELSPSYAHAP HPLLLQPQYG AQLILYKL

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NAME D103-AH3  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 221

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1 ATGGTTTTTC CCATAGAAGC CTTTGTAGGA CTAGTAACCT TCACATTTCT CTTATACTTC
61 CTATGGACAA AAAAATCTCA AAAACTTCCA AAACCCTTAC CACCGAAAAT CCCC GGAGGA
121 TGGCCGGTAA TCGGCCACCT TTTTCACTTC AATAACGACG GCGACGACCG TCCATTAGCT
181 CGAAAACTCG GAGACTTAGC TGATAAATAC GGCCCCGTTT TCACTTTTCG GCTAGGTCTT
241 CCCCTTGTGC TAGTTGTAAG CAGTTACGAA GCTACAAAAG ATTGCTTCTC TACAAATGAC
301 GCCATTTTCT CCAATCGTCC AGCTTTTCTT TACGGCGAAT ACCTTGGCTA CAATAATACA
361 ATGCTTTTTTC TAGCAAATTA CGGACCTTAC TGGCGAAAAA ATCGTAAATT AGTCATTTCAG
421 GAAGTTCTCT CTGCTAGTCG TCTCGAAAAA TTCAAACAAG TGAGATTTCAC CAGAATTCAA
481 ACGAGCATTA AGAATTTATA CACTCGAATT AATGGAAATT CGAGTACGAT AAATCTAACT
541 GATTGGTTAG AAGAATTGAA TTTTGGTCTG ATCGTGAAAA TGATCGCTGG GAAAAATTAT
601 GAATCCGGTA AAGGAGATGA ACAAGTGGAA AGATTTAAGA ATGCGTTTAA GGATTTTATG
661 GTTTTATCAA TGGAATTTGT ATTATGGGAT GCATTTCCAA TTCCATTATT TAAATGGGTG
721 GATTTTCAAG GTCATATTAA GACAATGAAA AGGACATTTA AGGATATAGA TTCTGTTTTT
781 CAGAACTGGT TAGAGGAACA TATTAATAAA AGAGAAAAAA TGGAGGTGG TGCAGAAGGG
841 AATGAACAAG ATTTCAATTGA TGTGGTGCTT TCAAAATTGA GTAAAGAATA TCTTGATGAA
901 GGTTACTCTC GTGATACTGT CATTAAAGCA ACAGTTTTTA GTTTGGTCTT GGATGCAGCA
961 GACACAGTTG CTCTTCACAT AAATTGGGGA ATGACATTAT TGATAAACAA TCAAAATGCC
1021 TTGATGAAAG CACAAGAAGA GATAGACACA AAAGTTGGTA AGGATAGATG GGTAGAAGAG
1081 AGTGATATTA AGGATTTAGT ATACCTCCAA GCTATTGTTA AAAAGGTGTT ACGATTATAT
1141 CCACCAGGAC CTTTGTTAGT ACCACATGAA AATGTAAAGG ATTGTGTTGT TAGTGGATAT
1201 CACATTCCTA AAGGGACTAG ATTATTGCGA AACGTCATGA AACTGCAGCG CGATCCTAAA
1261 CTCTTGTCOA ATCCTGATAA GTTCGATCCA GAGAGATTCA TCGCTGGTGA TATTGACTTC
1321 CGTGGTCAAC ACTATGAGTT TATCCCATCT GGTTCCTGGAA GACGATCTTG TCCGGGGATG
1381 ACTTATGCAT TGCAAGTGGA ACACCTAACA ATGGCACATT TAATCCAGGG TTTCAATTAC
1441 AAAACTCCAA ATGACGAGGT CTTGGATATG AAGGAAGGTG CAGGCATAAC AATACGTAAG
1501 GTAAATCCAG TGGAATTGAT AATAACGCCT CGCTTGGCAC CTGAGCTTTA CTAAAACCTA
1561 AGATCTTCA TCTTGTTGA TCATTGTTA ATA

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SEQ. ID. NO. 222

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1 MVFPIEAFVG LVTFTFLLYF LWTKKSQKLP KPLPPKIPGG WPVIGHLFHF NNDGDDRPLA
61 RKLGLDADKY GPVFTFRLGL PLVLVVSSYE ATKDCFSTND AIFS NRPAFL YGEYLGYNNT
121 MLFLANYGPY WRKNRKLVIQ EVLSASRLEK FKQVRFTRI TSIGNLYTRI NGNSSTINLT
181 DWLEELNFGI IVKMIAGKNY ESGKGDEQVE RFKNAFKDFM VLSMEFVLWD AFPIPLFKWV
241 DFQGHKTMK RTFKDIDSFV QNWLEEHINK REKMEVGAEG NEQDFIDVVL SKLSKEYLDE
301 GYSRDTVIKA TVFSLVLDA DTVALHINWG MTLINNNQNA LKMAQEEIDT KVGKDRWVEE
361 SDIKDLVYLQ AIVKKVLRLY PPGPLLVPHE NVKDCVVSgy HIPKGTRLEA NVMKLQRDPK
421 LLSNPDKFDP ERFIAGDIDF RGHHYEFIPS GSGRRSCPGM TYALQVEHLT MAHLIQGFNY
481 KTPNDEVLDL KEGAGITIRK VNPVELIITP RLAPELY

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NAME D208-AD9  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 223

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1 ATGCTTTCTC CCATAGAAGC CATTGTAGGA CTAGTAACCT TCACATTTCT CTTCTTCTTC
61 CTATGGACAA AAAAATCTCA AAAACCTTCA AAACCCCTTAC CACCGAAAAT CCCC GGAGGA
121 TGGCCGGTAA TCGGCCATCT TTTCCACTTC AATGACGACG GCGACGACCG TCCATTAGCT
181 CGAAACTCG GAGACTTAGC TGACAAATAC GGCCCCGTTT TCACTTTTCG GCTAGGCCTT
241 CCCCTTGTCT TAGTTGTAAG CAGTTACGAA GCTGTAAAAG ACTGTTTCTC CACAAATGAC
301 GCCATTTTTT CCAATCGTCC AGCTTTTCTT TACGGCGATT ACCTTGGCTA CAATAATGCC
361 ATGCTATTTT TGGCCAATTA CGGACCTTAC TGGCGAAAAA ATCGAAAATT AGTTATTTCAG
421 GAAGTTCTCT CCGCTAGTCG TCTCGAAAAA TTCAAACACG TGAGATTTCG AAGAATTCAA
481 GCGAGCATGA AGAATTTATA TACTCGAATT GATGGAAATT CGAGTACGAT AAATTTAACT
541 GATTGGTTAG AAGAATTGAA TTTTGGTCTG ATCGTGAAGA TGATCGCTGG AAAAAATTAT
601 GAATCCGGTA AAGGAGATGA ACAAGTGGAG AGATTTAAGA AAGCGTTTAA GGATTTTATG
661 ATTTTATCAA TGGAGTTTGT GTTATGGGAT GCATTTCCAA TTCCATTATT TAAATGGGTG
721 GATTTTCAAG GGCATGTTAA GGCTATGAAA AGGACTTTTA AAGATATAGA TTCTGTTTTT
781 CAGAATTGGT TAGAGGAACA TATTAATAAA AGAGAAAAAA TGGAGGTTAA TGCAGAAGGG
841 AATGAACAAG ATTTCATTTGA TGTGGTGCTT TCAAAAATGA GTAATGAATA TCTTGGTGAA
901 GGTTACTCTC GTGATACTGT CATTGAAGCA ACGGTGTTTA GTTTGGTCTT GGATGCAGCA
961 GACACAGTTG CTCTTCACAT AAATTGGGGA ATGGCATTAT TGATAAACAA TCAAAAGGCC
1021 TTGACGAAAG CACAAGAAGA GATAGACACA AAAGTTTGTA AGGACAGATG GGTAGAAGAG
1081 AGTGATATTA AGGATTTGGT ATACCTCCAA GCTATTGTGA AAGAAAGTGT ACGATTATAT
1141 CCACCAGGAC CTTTGTAGT ACCACACGAA AATGTAGAAG ATTGTGTTGT TAGTGGATAT
1201 CACATTCCTA AAGGGACAAG ATTATTGCGA AACGTCATGA AACTGCAACG TGATCCTAAA
1261 CTCTGGTCTG ATCCTGATAC TTTCGATCCA GAGAGATTCA TTGCTACTGA TATTGACTTT
1321 CGTGGTCACT ACTATAAGTA TATCCCGTTT GGTCCCTGGAA GACGATCTTG TCCAGGGATG
1381 ACTTATGCAT TGCAAGTGGA ACACTTAACA ATGGCACATT TGATCCAAGG TTTCAATTAC
1441 AGAACTCCAA ATGACGAGCC CTTGGATATG AAGGAAGGTG CAGGCATAAC TATACGTAAG
1501 GTAAATCCTG TGGAACTGAT AATAGCGCCT CGCCTGGCAC CTGAGCTTTA TAAAACCTA
1561 AGATGTTTCA TCTTGGTTGA

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SEQ. ID. NO. 224

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1 MLSPIEIVG LVTFTFLFF LWTKKSQKPS KPLPPKIPGG WPFVIGHLFHF NDDGDDRPLA
61 RKLGLADKY GPVFTFRLGL PLVLVVSSYE AVKDCFSTND AIFSNRPAFL YGDYLGYNNA
121 MLFLANYGPY WRKNRKLVIQ EVLSASRLEK FKHVRFARIQ ASMKNLYTRI DGNSSTINLT
181 DWLEELNFGI IVKMIAGKNY ESGKGDEQVE RFKKAFFKDFM ILSMEFVLWD AFPIPLFKWV
241 DFQGHVKAMK RTFKDIDSVE QNWLEEHINK REKMEVNAEG NEQDFIDVVL SKMSNEYLGE
301 GYSRDTVIEA TVFSLVLDAA DTVALHINWG MALLINNQKA LTKAQEEIDT KVCKDRWVEE
361 SDIKDLVYLQ AIVKEVLRLY PPGPLLVPHE NVEDCVVSGY HIPKGTRLFA NVMKLQRPDK
421 LWSDPDTFDP ERFIATDIDF RGQYYKYIPF GPGRRSCPGM TYALQVEHLT MAHLIQGFNY
481 RTPNDEPLDM KEGAGITIRK VNPVELIAP RLAPELY

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NAME D237-AD1  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 225

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1 TTTTCATATAC CTTTAGTACT CTTGAAATTT TCAAATAATG GTTTATCTTC TTTCTCCCAT
61 AGAAGCCATT GTAGGATTTG TAACCTTTTC ATTTCTATTC TACTTTCTAT GGACCAAAAA
121 ACAATCAAAA ATCTTAAACC CACTACCTCC AAAAATCCCA GGTGGATGGC CAGTAATCGG
181 CCATCTCTTT TATTTCAAGA ACAATGGCGA TGAAGATCGC CATTTTTCTC AAAAAGCTCGG
241 TGACTTAGCT GACAAATATG GTCCCGTCTT CACTTTCCGG TTAGGGTTTC GCCGTTTCTT
301 GCGGGTGAGT AGTTATGAAG CTATGAAAGA ATGCTTCACT ACCAATGATA TCCATTTCCG
361 CGATCGGCCA TCTTTACTCT ACGGAGAATA CCTTTGCTAT AATAACGCCA TGCTTGCTGT
421 TGCCAAATAT GGCCCTTACT GGAAAAAATA TCGAAAGTTA GTCAATCAAG AAGTCTCTC
481 CGTTAGTCGG CTCGAAAAAT TCAAACATGT TAGATTTTCT ATAATTCAGA AAAATATTAA
541 ACAATTGTAT AATTGTGATT CACCAATGGT GAAGATAAAC CTTAGTGATT GGATAGATAA
601 ATTGACATTC GACATCATTT TGAAAATGGT TGTGGGAAG AACTATAATA ATGGACATGG
661 AGAAATACTC AAAGTTGCTT TTCAGAAATT CATGGTCAA GCTATGGAGA TGGAGCTCTA
721 TGATGTTTTT CACATCCCAT TTTTCAAGTG GTTGGATCTT ACAGGGAATA TTAAGGCTAT
781 GAAACAAACT TTCAAAGACA TTGATAATAT TATCCAAGGT TGGTTAGATG AGCACATTAA
841 GAAGAGAGAA ACAAAGGATG TTGGAGGTGA AAACGAACAA GATTTTATAG ATGTGGTGCT
901 TTCCAAGATG AGCGACGAAC ATCTTGCGGA GGGTTACTCT CATGACACAA CCATCAAAGC
961 AACTGTATTC ACTTTGGTCT TGGATGCAAC AGACACACTT GCACTTCATA TAAAGTGGGT
1021 AATGGCGTTA ATGATAAACA ATAAGCATGT CATGAAGAAA GCACAAGAAG AGATGGACAC
1081 AATTGTTGGT AGAGATAGAT GGGTAGAAGA GAGTGATATC AAGAATTTGG TGTATCTCCA
1141 AGCAATTGTC AAAGAAGTAT TACGATTACA TCCACCCGCA CCTTTGTCTG TGCAACACCT
1201 ATCTGTAGAA GATTGTGTTG TCAATGGGTA CCATATTCCT AAGGGGACTG CACTACTTAC
1261 CAATATTATG AACTACAGC GAGATCCTCA AACATGGCCA AATCCTGATA AATTGCATCC
1321 AGAGAGATTC CTGACGACTC ATGCTACTAT TGACTACCGC GGGCAGCACT ATGAGTCGAT
1381 CCCCTTTGGT ACGGGGAGAC GAGCTTGTCG CGCGATGAAT TATTCATTGC AAGTGGAAAC
1441 CCTTTCAATT GCTCATATGA TCCAAGGTTT CAGTTTTGCA ACTACGACCA ATGAGCCTTT
1501 GGATATGAAA CAAGGTGTGG GTTTAACTTT ACCAAAGAAG ACTGATGTTG AAGTGCTAAT
1561 TACACCTCGC CTTCCCTCCTA CGCTTTATCA ATATTAAGAT GTTTTGTTGT CGGGATTCTG
1621 TCTGATCAAT CCCTCAATG

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SEQ. ID. NO. 226

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1 MVYLLSPIEA IVGFVTFSL FYFLWTKKQS KILNPLPPKI PGGWVPVIGHL FYFKNNGDED
61 RHFSQKLGLD ADKYGPVFTF RLGFRFLAV SSYEAMKECF TTNDIHFADR PSLLYGEYLC
121 YNNAMLAVAK YGPYWKKNRK LVNQEVLSVS RLEKFKHVRF SIIQKNIKQL YNCDSMPVKI
181 NLSDWIDKLT FDIILKMVVG KNYNNGHGEI LKVAFOKFEMV QAMEMELYDV FHIPFFKWLD
241 LTGNIKAMKQ TFKDIDNIIQ GWLDEHIKKR ETKDVGGENE QDFIDVVL SK MSDEHLGEGY
301 SHDTTIKATV FTLVL DATDT LALHIKWMA LMINKHVMK KAQEEMDTIV GRDRWVEESD
361 IKNLVYLQAI VKEVLRLHPP APLSVQHLSV EDCVVNGYHI PKGTALLTNI MKLQRDPQTW
421 PNPDKFDPER FLTTHATIDY RGQHYESIPF GTGRRACPAM NYSLQVEHLS IAHMIQGFSE
481 ATTTNEPLDM KQGVGLTLPK KTDVEVLITP RLPPTLYQY

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FIG. 114

NAME D125-AF11  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 227

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1 CTTTTTCTCC CCAAAAAAGA GCTCATTTC CTTGTCCCCA AAAATGGATC TTCTCTTACT
61 AGAGAAGACC TTAATTGGTC TCTTCTTTGC CATTTTAATC GCTATAATTG TCTCTAGACT
121 TCGTTCAAAG CGTTTAAAGC TTCCCCCAGG ACCAATCCCA GTACCAGTTT TTGGTAATTG
181 GCTTCAAGTT GGTGATGATT TAAACCACAG AAATCTTACT GATTTTGCCA AAAAATTGG
241 TAGCTTTTC TTGTTAAGAA TGGGCCAGCG TAATTTAGTT GTTGTGTCAT CTCCTGAATT
301 AGCTAAAGAA GTTTTACACA CACAAGGTGT TGAATTTGGT TCAAGAACAA GAAATGTTGT
361 ATTTGATATT TTTACTGGAA AAGGTCAAGA TATGGTTTTT ACTGTATATG GTGAACACTG
421 GAGAAAAATG AGGAGAATTA TGAAGTACC ATTTTCTTACT AATAAAGTTG TGCAGCAATA
481 TAGAGGGGGG TGGGAGTTTG AAGTGGCAAG TGTAAATTGAG GATGTGAAGA AAAATCCTGA
541 ATCTGCTACT AATGGGATTG TATTAAGGAG GAGATTACAA TTGATGATGT ATAATAATAT
601 GTTTAGGATT ATGTTTGATA GGAGATTGGA GAGTGAAGAT GATCCTTTGT TTGTTAAGCT
661 TAAGGCTTTG AATGGTGAAA GGAGTAGATT GGCTCAGAGT TTTGAGTATA ATTATGGTGA
721 TTTTATTTCC ATTTTGAGGC CTTTTTTGAG AGGTTATTTG AAGATCTGTA AAGAAGTTAA
781 GGAGAAGAGG CTGCAGCTTT TCAAAGATTA CTTTGTGAT GAAAGAAAGA AGCTTTCAAA
841 TACCAAGAGC TTGGACAGCA ATGCTCTGAA ATGTGCGATT GATCACATTC TTGAGGCTCA
901 ACAGAAGGGG GAGATCAATG AGGACAACGT TCTTTACATT GTTGAAAACA TCAATGTTGC
961 TGCTATAGAA ACCACATTAT GGTCAATTGA GTGGGGTATC GCCGAGTTAG TCAACCAACC
1021 TCACATCCAA AAGAAACTCC GCGACGAGAT TGACACAGTT CTTGGCCCAG GAGTGCAAGT
1081 GACTGAACCA GACACCCACA AGCTTCCATA CCTTCAGGCT GTGATCAAGG AGACGCTTCG
1141 TCTCCGTATG GCAATTCCTC TATTAGTCCC ACACATGAAC CTTACGATG CAAAGCTTGG
1201 CGGGTTTGAT ATTCCAGCAG AGAGCAAAAT CTTGGTTAAC GCTTGGTGGC TAGCTAACAA
1261 CCCGGCTCAT TGGAAGAAAC CCGAAGAGTT CAGACCCGAG AGGTTCTTCG AAGAGGAGAA
1321 GCACGTTGAG GCCAATGGCA ATGACTTCAG ATATCTTCCG TTTGGCGTTG GTAGGAGGAG
1381 TTGCCCTGGA ATTATACTTG CATTGCCAAT TCTTGGCATT ACTTTGGGAC GTTTGGTTCA
1441 GAACTTTGAG CTGTTGCCTC CTCCAGGCCA GTCGAAGCTC GACACCACAG AGAAAGGTGG
1501 ACAGTTCAGT CTCCATATTT TGAAGCATTC CACCATTGTG TTGAAACCAA GGTCTTGCTG
1561 AACTTTCTGA TCCTAATCAA TTAAGGGGTT GAAGAAATTT TATAATTATG

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SEQ. ID. NO. 228

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1 MDLLLLLEKTL IGLFFAILIA IIVSRLRSKR FKLPPGPIPV PVFGNWLQVG DDLNHRNLTD
61 FAKKFGDLFL LRMGQRNLVV VSSPELAKEV LHTQGVFEFS RTRNVVDFIF TGKGQDMVFT
121 VYGEHWRKMR RIMTVPFFTN KVVQYRGGW EFEVASVIED VKKNPESATN GIVLRRRLQL
181 MMYNNMFRIM FDRRFESEDD PLFVKLKALN GERSRLAQSF EYNYGDFIPI LRPFLRGYLYK
241 ICKEVKEKRL QLFKDYFVDE RKKLSNTKSL DSNALKCAID HILEAQQKGE INEDNVLYIV
301 ENINVAAIET TLWSIEWGIA ELVNHPHIQK KLRDEIDTVL GPGVQVTEPD THKLPYLQAV
361 IKETLRLRMA IPLLVPHMNL HDAKLGGFID PAESKILVNA WWLANNPAHW KKPEEFRPER
421 FFEEKHVEA NGNDFRYLPF GVGRRSCPGI ILALPILGIT LGRLVQNFEL LPPPGQSKLD
481 TTEKGGQFSL HILKHSTIVL KPRSC

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FIG. 115

56/111

NAME D134-AE11  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 229

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1 AACAAATAAAA ATGGAGACAT TATTTAACAT CAAAGTTGCA GTTTCATTAG TAATTGTGAT
61 AATTTTTCTG AGATGGGTAT GGAAATTCTT GAATTGGGTG TGGATTCAAC CAAAGAAAAT
121 GGAAAAAAGA CTAAAAATGG AAGGTTTCAA AGGAAGCTCA TATAAGCTAT TATTTGGAGA
181 TATGAAAAGAA ATAAATACAA TGGTTGAAGA AGCCAAAACC AAGCCTATGA ATTTTACCAA
241 TGATTATGTG GCTAGAGTCT TGCCTCACTT CACAAAGTTG ATGCTCCAAT ATGGCAAGAA
301 TAGCTTTTATG TGGTTAGGGC CAAAACCAAC AATGTTTATC ACAGACCCTG AACTAATAAG
361 GGAGATCTTG TCAAAAAGTT ACATATACCA GGAGATTCAA GGCAATCCAA TCACTAAGTT
421 GCTAGCACAA GGACTAGTAA GTTATGAAGC AGAGAAATGG GCTAAGCATA GAAAAATTAT
481 CAATCCTGCA TTTCACCTTG ACAAGTTGAA GCATATGCTA CCATCATTCT ACTTGAGTTG
541 TTGTGACATG CTCAGAAAAT GGGAAAGTAT AGCTTCATCA GAGGGATCAG AAATAGACGT
601 GTGGCCTTTT CTGGAAACGT TGACAAGCGA TGCTATTTCA AGAACAGCTT TTGGTAGTAA
661 CTATGAAGAC GGGAGACAGA TATTTGAGCT TCAAAAAGAA CAAGCTGAGT TGATTTTACA
721 AGCAGCGCGA TGGCTTTACA TCCCCGGATG GAGGTTTGTG CCAACAAAGA GGAACAAGAG
781 GATGAAGCAA ATCGCTAAAG AAGTACGATC ATTAGTGTTG GGAATAATCA ATAAGAGAAT
841 AAGGGAAATG AAAGCAGGGG AAGCTGCAAA AGATGACTTA CTGGGAATAC TATTGGAATC
901 TAATTTCAAA GAAATCCAAA TGCACGGAAA CAAGAACTTT GGCATGACTA TCGACGAAGT
961 GATTGAAGAG TGCAAGTTAT TTTACTTTGC TGGGCAAGAA ACTACTTCAG TTTTGCTTGT
1021 TTGGACTTTG ATTTTACTGA GTAAGCATGT CGATTGGCAA GAAAGAGCTA GAGAAGAAGT
1081 TCATCAAGTC TTTGGAAGTA ACAAACCTGA TTATGACGCA TTGAATCAGT TGAAAGTTGT
1141 AACGATGATA TTCAACGAGG TTTTAAGGTT GTACCCACCG GGAATTACCA TAAGTCGAAC
1201 TGTACACGAG GATACCAAAT TAGGGAACCTT GTCATTGCCA GCAGGGATAC AGCTTGTTGT
1261 ACCTGCAATT TGGTTGCATC ATGACAATGA AATATGGGGA GATGATGCAA AGGAGTTCAA
1321 ACCAGAGAGG TTTAGTGAAG GAGTTAATAA AGCAACAAAG GGTAAATTTG CATATTTTCC
1381 ATTTAGTTGG GGACCAAGAA TATGTGTTGG ACTGAATTTT GCAATGTTAG AGGCAAAAAT
1441 GGCACTTGCA TTGATTCTAC AACACTATGC TTTTGAGCTC TCTCCATCTT ATGCACATGC
1501 TCCTCATACA ATTATCACTC TGCAACCTCA ACATGGTGCT CCTTTGATTT TGCGCAAGCT
1561 GTAGCGCGGA TATATTGATT GGTTATCTAC TGTAG

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SEQ. ID. NO. 230

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1 METLFNIKVA VSLVIVIIFL RWVWKFLNWV WIQPKKMEKR LKMEGFKGSS YKLLFGDMKE
61 INTMVEEAKT KPMNFTNDYV ARVLPHTKL MLQYGKNSFM WLGPKPTMFI TDPFLIREIL
121 SKSYIYQEIQ GNPITKLLAQ GLVSYEAEKW AKHRKIINPA FHLDKLKHL PSFYLSCCDM
181 LRKWESIASS EGSEIDVWPF LETLTSDAIS RTAFGSNYED GRQIFELQKE QAEILILQAAR
241 WLYIPGWRV PTKRNKRMKQ IAKEVRSVLV GIINKRIREM KAGEAAKDDL LGILLESNEFK
301 EIOMHGKNKF GMTIDEVIEE CKLFYFAGQE TTSVLLVWTL ILLSKHVDWQ ERAREEVHVQV
361 FGSNKP DYDA LNQLKVVTMI FNEVLRLYPP GITISRTVHE DTKLGNLSLP AGIQLVLPAL
421 WLHHDNEIWG DDAKEFKPER FSEGVNKATK GKFAYFPFSW GPRICVGLNF AMLEAKMALA
481 LILQHYAFEL SPSYAHAPHT IITLQPQHGA PLILRLK

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FIG. 116

NAME D209-AH12  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 231

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1 ATATGCAACT GAGATTTGAA GAATACCAAC TAACCAAAAT GCAGTTCTTC AGCTTGGTTT
61 CCATTTTCCT ATTTCTATCT TTCCTCTTTT TGTTAAGGAT ATGGAAGAAC TCCAATAGCC
121 AAAGCAAAAA GTTGCCACCA GGTCCATGGA AACTACCAAT ACTAGGAAGT ATGCTTCATA
181 TGGTTGGTGG ACTACCACAC CATGTCCTTA GAGATTTAGC CAAAAAATAT GGACCACTTA
241 TGCACCTTCA ATTAGGTGAA GTTCTGCGG TTGTGGTTAC TTCTCCTGAT ACGGC AAAAG
301 AAGTATTAAA AACTCATGAC ATCGCTTTTG CGTCTAGGCC TAGCCTTTTG GCCCGGAGA
361 TTGTCTGTTA CAATAGGTCT GATCTAGCCT TTTGCCCTTA TGGCGACTAT TGGAGACAAA
421 TGCGTAAAAT ATGTGTCTTG GAAGTGCTCA GTGCCAAGAA TGTTCCGGACA TTTAGCTCTA
481 TTAGGCGGAA TGAAGTTCTT CGTCTCATT ATTTTATCCG GTCATCTTCT GGTGAACCTA
541 TTAATGTTAC GGAAGGATC TTTTGTTC CAAGCTCCAT GACATGTAGA TCAGCGTTTG
601 GGCAAGTGTT CAAAGAGCAA GACAAATTTA TACAATAAT TAAAGAAAGT ATACTCTTAG
661 CAGGAGGGTT TGATGTGGCT GACATATTCC CTTCACTGAA GTTCTTTCAT GTGCTCAGTG
721 GAATGAAGGG TAAGATTATG AATGCACACC ATAAGGTAGA TGCCATTGTT GAGAATGTCA
781 TCAATGAGCA CAAGAAAAAT CTTGCAATTG GGAAACTAA TGGAGCGTTA GGAGGTGAAG
841 ATTTAATTGA TGTTCTTCTA AGACTTATGA ATGATGGAGG CCTTCAATTT CCTATCACC
901 ACGACAACAT CAAAGCCATA ATTTTGTACA TGTTTGCTGC CGGGACAGAG ACTTCATCGT
961 CAACAATTGT GTGGGCTATG GTAGAAATGG TGA AAAATCC AGCCGTATTC GCGAAAGCTC
1021 AAGCAGAAAGT AAGAGAAGCA TTTAGAGGAA AAGAACTTT CGATGAAAAT GATGTGGAGG
1081 AGCTAAACTA CCTAAAGTTA GTAATAAAAG AAACCTAAG ACTTCATCCA CCGGTTCCAC
1141 TTTTGCTCCC AAGAGAATGT AGGGAAGAGA CAAATATAAA CGGCTACACT ATTCCTGTAA
1201 AGACCAAAGT CATGGTTAAT GTTTGGGCTT TGGGAAGAGA TCCAAAATAT TGGAATGACG
1261 CAGAACTTT TATGCCAGAG AGATTTGAGC AGTGCTCTAA GGATTTTGT GGTAAATAATT
1321 TTGAATATCT TCCATTTGGT GCGGGAAGGA GGATTTGTCC TGGGATTTG TTTGGCTTAG
1381 CTAATGCTTA TTTGCCATTG GCTCAATTAC TATATCACTT CGATTGGAAA CTCCCTGCTG
1441 GAATCGAACC AAGCGACTTG GACTTGACTG AGTTGGTTGG AGTAACTGCC GCTAGAAAAA
1501 GTGACCTTTA CTTGGTTGCG ACTCCTTATC AACCTCCTCA AAAGTGATTT AATGGTTTCA
1561 AGTTTTTATT TCCTAGCAA CCCCCTATT GTCCTATCTT TCTTTTGGTG TTTTCGGTTT
1621 TATCTACTCT AATACATGCA TCTTTTACCA TATAGGAATG TACCATGTTG TCG

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SEQ. ID. NO. 232

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1 MQLRFEEYQL TKMQFFSLVS IFLFLSFLFL LRIWKNSNSQ SKKLPPGPWK LPILGSM LHM
61 VGGLPHHVLR DLAKKYGPLM HLQLGEVSAV VVTSPDTAKE VLKTHDIAFA SRPSLLAPEI
121 VCYNRSDLAF CPYGDYWRQM RKICVLEVLS AKNVRTFSSI RRNEVLRLIN FIRSSSGEPI
181 NVTERIFLFT SSMTCRSAFG QVFKEQDKFI QLIKEVILLA GGFDVADIFP SLKFLHVL SG
241 MKGKIMNAHH KVDAIVENVI NEHKKNLAIK KTNALGGED LIDVLLRLMN DGGLQFPITN
301 DNIAIIFDM FAAGTETSSS TIVWAMVEMV KNPAVFAKAQ AEVREAFRGK ETFDENDVEE
361 LNYLKLVIKE TLR LHPPVPL LLPRECREET NINGYTIPVK TKVMVNVWAL GRDPKYW NDA
421 ETFMPEPFEQ CSKDFVGNNF EYLPFGGRR ICPGISFGLA NAYLPLAQLL YHFDWKLPAG
481 IEPDLDLTE LVGVTAARKS DLYLVATPYQ PPQK

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FIG. 117

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NAME D221-BB8  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 233

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1 GAATTATTTT ACCTGTTGTA TTCCTTGTCT ATGATAGGAA GCTCGTTACC TCAGCGTACA
61 AACCCCAAAT AAAAAATGAA TTTCTTGTG GTGTTAGCTT CTCTCTTTCT CTTTGTGTTT
121 CTAATGAGGA TAAGCAAAGC AAAAAAGCTC CCTCCAGGTC CAAGGAAACT GCCTATAATA
181 GGAAACCTTC ATCAAATTGG AAAATTACCT CATCGTTCAC TTCAAAAACCT TTCTAATGAA
241 TATGGGGATT TCATTTTCTT GCAATTAGGT TCTGTACCGA CTGTGGTTGT CTCCTCAGCT
301 GACATTGCCC GAGAGATCTT TAGAACTCAC GACCTTGTTT TCTCAGGCCG TCCTGCTTTA
361 TATGCTGCCA GAAAACCTTC CTACAATTGC TACAACGTTT CATTTGCACC CTATGGTAAT
421 TACTGGAGAG AGGCTCGGAA AATTCTAGTG TTGGAGTTGC TAAGTACAAA GAGAGTACAA
481 AGTTTCGAGG CAATTCGAGA CGAGGAAGTA AGTAGCTTGG TTCAAATTAT CTGTAGTTCC
541 TTGAGCTCAC CTGTTAACAT AAGCACATTA GCACTATCCT TGGCAAATAA CGTTGTTTGT
601 CGAGTGGCTT TTGGGAAAGG GAGTGCTGAA GGAGGAAATG ATTATGAGGA TAGGAAGTTT
661 AATGAAATTC TATATGAGAC ACAAGAATTA TTGGGTGAGT TTAACGTTGC TGATTATTTT
721 CCTCGGATGG CATGGATTAA CAAAATAAAT GGGTTTGATG AACGATTGGA AAATAATTTT
781 AGGGAATTGG ATAAGTTTAA TGACAAAGTA ATAGAAGATC ATCTTAATTC ATGTAGCTGG
841 ATGAAACAAA GGGATGATGA AGACGTTATT GATGTATTGC TTCGAATTCA AAAGGATCCA
901 AGCCAAGAAA TTCCTCTCAA AGATGATCAC ATTAAGGGCC TTCTTGCGGA TATATTCATA
961 GCTGGAACATG ATACATCATC AACAACCATA GAATGGGCAA TGTCAGAACT CATAAAAAAT
1021 CCAAGAGTCT TGAGAAAAGC TCAAGAGGAA GTTAGAGAAG TTTCTAAGGG AAAACAAAAG
1081 GTCCAAGAAA GTGATCTTTG CAACTAGAT TACTTGAAAT TGGTCATCAA AGAAACCTTT
1141 AGACTACACC CACCAGTCCC ATTACTAGTC CCTCGAGTAA CAACAGCCAG CTGCAAAATA
1201 ATGGAATACG AAATTCAGT AAATACAAGA GTCTTCATCA ACGCGACAGC AAATGGGACA
1261 AATCCAAAAT ACTGGGAAAA TCCATTGACA TTCTTGCCAG AGAGATTCTT GGATAAGGAG
1321 ATTGATTACA GAGGCAAAAA TTTTGAGTTG TTGCCATTG GGGCAGGGAG AAGAGGGTGT
1381 CCAGGAATTA ATTTTCAAT ACCACTTGTT GAGCTTGCAC TTGCTAATCT ATTGTTTCAT
1441 TATAATTGGT CACTTCCTGA AGGGATGCTA GCTAAGGATG TTGATATGGA AGAAGCTTTG
1501 GGGATTACCA TGCACAAGAA ATCTCCCTT TGCTTAGTAG CTTCTCATT TACTTGTGTA
1561 GATTTTAAAA GATTTTAGCA TAGCTATATA TAGCTTGAAG T

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SEQ. ID. NO. 234

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1 MNFLVVLASL FLFVFLMRIS KAKKLPPGPR KLPIIGNLHQ IGKLPHRSLQ KLSNEYGDFI
61 FLQLGSVPTV VVSSADIARE IFRTHDLVFS GRPALYAARK LSYNCYNVSF APYGNWREA
121 RKILVLELLS TKRVQSFEAI RDEEVSSLVQ IICSSLSSPV NISTLALSIA NNVCVRVAFG
181 KGSAEGGNDY EDRKFNEILY ETQELLGEFN VADYFPRMAW INKINGFDER LENNFRELDK
241 FYDKVIEDHL NSCSWMKQRD DEDVIDVLLR IQKDPSQEIP LKDDHIKGLL ADIFIAGTDT
301 SSTTIEWAMS ELIKNPRVLR KAQEEVREVS KGKQKVQESD LCKLDYLLKV IKETFRLHPP
361 VPLLVPRTVT ASCKIMEYEI PVNTRVFINA TANGTNPKYW ENPLTFLPER FLDKEIDYRG
421 KNFELLPFGA GRRGCPGINF SIPLVELALA NLLFHYNWSL PEGMLAKDVD MEEALGITMH
481 KKSPLCLVAS HYTC

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NAME D222-BH4  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 235

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1 CAAAGACTAA AAGATGTCGG TCTTTGCGGT TATTTCAATC TTTCTACTTC TGTTTTTTCT
61 TTTCAAATCA TATTTGCCCT CATCGAAAAC AAAGAAAAAT TCTCCACCAT CTCCTTCAAA
121 GCTTCCGTTA ATCGGTCACT TCCACAAACT AGGCTTACAA CCTCACC GTT CTCTACAAAA
181 ACTATCAAAT GAACATGGTC CCATGATGAT GCTTCAATTC GGTAGCGTAC CTGTGCTTAT
241 CGCTTCATCA GCTGAAGCTG CTTCCGAAAT CATGAAAACC CAAGATTTGT CTTTTGCAAA
301 CAAACCCATT TCAACCATTC CTAGCAAGCT TTTCTTCGGC CCAAAGGACG TTGCCTTCAC
361 CCCATATGGG GATTACTGGA GGAATGCCAG AAGCATTTC ATGCTTCAGC TTTTGAACAA
421 CAAAAGAGTC CAGTCTTTTC GAAAGATAAG GGAAGAAGAG ACTTCTCTTC TTCTCCAGAG
481 GATTAGGGAA TCGCCAAATT CAGAAGTCGA TTTAACGGAG CTGTTCGTTT CCATGACTAA
541 CGACATAGTT TGCAGGGTGG CCTTAGGAAG GAAGTATTGT GATGGGGAAG AAGGGAGGAA
601 ATTCAAGTCT TTGCTGTTAG AGTTTGTGGA ATTGTTGGGA GTTTTAAACA TTGGAGATTA
661 CATGCCGTGG CTTGCATGGA TGAATCGTT CAATGGTTTG AATGCCAAAG TGGATAAAGT
721 GGCAGAAAGAG TTTGATGCAT TTTTGGAGGA TGTGATTGAG GAACACGGAG GAAATAAGAA
781 ATCAGACACT GAAGCTGAAG GGGCAGACTT CGTGGATATA TTATTGCAGG TTCACAAAGA
841 AAACAAGGCT GGTTTTCAAG TCGAAATGGA TGCAATCAAA GCTATTATCA TGGATATGTT
901 TGCTGCGGGA ACAGATACAA CTTCCACGCT TCTAGAGTGG ACAATGAACG AGCTCTTAAG
961 AAATCCAAAA ACATTGAATA AGTTGAGAGA TGAGGTGAGA CAAGTGACTC AAGGGAAGAC
1021 AGAGGTAACA GAGGATGACT TAGAGAAAAT GCCGTATTTA AGAGCAGCAG TTAAGGAGAG
1081 TTCCAGGCTA CACTCTCCAG TGCCACTTCT ACCTCGAGAA GCAATTAAGG ATGCAAAGGT
1141 TTTGGGCTAC GATATAGCTG CAGGGACTCA AGTCCTCGTT TGTCCATGGG CAATCTCAAG
1201 AGATCCAAAC CTTTGGGAAA ATCCAGAGGA GTTTCAACCT GAAAGATTCT TGGATACTTC
1261 CATAGATTAC AAAGGCTTAC ATTTGAGTTC AATTCCATTC GGTGCAGGTC GGAGGGGTTG
1321 CCCTGGCATC ACATTGCTA AGTTTGTGAA TGAGCTAGCA TTGGCAAGAT TAATGTTCCA
1381 TTTTGATTTC TCGCTACCAA AAGGAGTTAA GCATGAGGAT TTGGACGTGG AGGAAGCTGC
1441 TGGAATTACT GTTAGAAGGA AGTTCCCCCT TTTAGCCGTC GCCACTCCAT GCTCGTGATT
1501 TTTATTTTAG AGCTCATTCT ATGCCTTAA AACTACTACT AGATAACTGC GTAGTAAATA
1561 ATGCTTGGA

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SEQ. ID. NO. 236

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1 MSVFAVISFF LLLFFLFKSY LPSSKTKKNS PPSPSKLPLI GHFHKLGLQP HRS LQKLSNE
61 HGPMMMLQFG SVPVLIASSA EAASEIMKTQ DLSFANKPIS TIPSKLFFGP KDVAFTPYGD
121 YWRNARSICM LQLLNKRVQ SFRKIREET SLLLQRIRES PNSEVDLTEL FVSMTNDIVC
181 RVALGRKYCD GEEGRKF KSL LLEFVELLGV FNIGDYMPWL AWMNRFNGLN AKVDKVAKEF
241 DAFLEDVIEE HGGNKSDTE AEGADFDIL LQVHKENKAG FQVEMDAIKA IIMDMFAAGT
301 DTTSTLLEWT MNELLRNPKT LNKLRDEVRO VTQKTEVTE DDLEKMPYLR AAVKESSRLH
361 SPVPLLPREA IKDAKVLGYD IAAGTQVLVC PWALSRDPNL WENPEEFQPE RFLDTSIDYK
421 GLHFELIPFG AGRRGCPGIT FAKFVNELAL ARLMFHFDLS LPKGVKHEDL DVEEAAGITV
481 RRKFPLLA VA TPCS

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FIG. 119

60/111

NAME D224-AF10  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 237

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1 ATTATCCATC ACCTAAAATG GAGAATTCTT GGGTTTTTCT AGCCTTGGCA GGGCTATCTG
61 CATTAGCTTT TCTCTGTAAA ATAATCACCT GTCGAAGACC GGTTAACCGG AAAATACCAC
121 CAGGTCCAAA ACCATGGCCC ATCATTGGCA ATTTGAACCT ACTTGGTCCT ATACCACATC
181 AATCTTTTGA CTTGCTTTCC AAAAAATATG GAGAGTTGAT GCTGCTGAAA TTTGGCTCCA
241 GGCCAGTTCT TGTTGCTTCA TCTGCTGAAA TGGCAAACA GTTTTAAAA GTACATGATG
301 CTAATTTTCG CTCCCGTCCT ATGCTAGCTG GTGGAAAGTA TACAAGCTAT AACTATTGTG
361 ACATGACATG GGCACCCTAT GGTCCCTATT GGCGCCAAGC ACGACGAATT TACCCTAACC
421 AGATATTTAC TCCGAAAAGG CTAGACTCGT TCGAGTACAT TCGTGTGAA GAAAGGCAGG
481 CCTTGATTTT CCAGCTGAAT TCCCTTGCTG GAAAGCCATT TTTTCTCAA GACCATTTGT
541 CGCGATTTAG CCTCTGCAGC ATGACAAGGA TGGTTTTGAG CAACAAGTAC TTTGGTGAAT
601 CAACAGTTAG AGTAGAAGAT TTGCAGTACC TGGTAGATCA ATGGTTCTTA CTTAATGGTG
661 CTTTCAACAT TGGAGATTGG ATTCCATGGC TCAGCTTCTT GGACCTACAA GGCTATGTGA
721 AACAAATGAA GGCTTTGAAA AGAACTTTTG ATAAGTTCCA CAACATTGTG CTAGATGATC
781 GCAGGGCTAA GAAGAATGCA GAGAAGAACT TTGTCCCAA AGACATGGTT GATGCTTGTG
841 TGAAGATGGC TGAAGATCCT AATCTGGAAG TCAAACCTAC TAATGACTGT GTCAAAGGGT
901 TAATGCAGGA TTTACTAACT GGAGGAACAG ATAGCTTAAC AGCAGCAGTG CAATGGGCAT
961 TTCAAGAACT TCTTAGACGG CCAAGGGTTA TTGAGAAGGC AACCGAAGAG CTTGACCGGA
1021 TTGTCGGGAA AGAGAGATGG GTAGAAGAGA AAGATTGCTC GCAGCTATCT TACGTTGAAG
1081 CAATCCTCAA GGAAACACTA AGGTTACATC CTCTAGGAAC TATGCTAGCA CCGCATTGTG
1141 CTATAGAAGA TTGTAACGTG GCTGGTTATG ACATACAGAA AGGAACGACC GTTCTGGTGA
1201 ATGTTTGGAC CATTGGAAGG GACCCAAAAT ACTGGGATAG AGCACAAGAG TTTCTCCCCG
1261 AGAGATTCTT AGAGAACGAC ATTGATATGG ACGGACATAA CTTTGCTTTC TTGCCATTTG
1321 GCTCGGGGCG AAGGAGGTGC CCTGGCTATA GCCTTGACT TAAGGTTATC CGAGTAACAT
1381 TAGCCAACAT GTTGCATGGA TTCAACTGGA AATTACCTGA AGGTATGAAG CCAGAAGATA
1441 TAAGTGTGGA AGAACATTAT GGGCTCACTA CACATCCTAA GTTTCCTGTT CCTGTGATCT
1501 TGGAATCTAG ACTTTCTTCA GATCTCTATT CCCCATCAC TTAATCCTAA GTGCTTCCTA
1561 TTATAGCATC ATATCAATAT CCCTC

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SEQ. ID. NO. 238

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1 MENSWFVLAL AGLSALAFLC KIITCRRPVN RKIPPGPKPW PIIGNLNLG PIPHQSFDDL
61 SKKYGELMLL KFGSRPVLVA SSAEMAKQFL KVHDANFASR PMLAGGKYTS YNYCDMTWAP
121 YGPYWRQARR IYLNQIFTPK RLDSFEYIRV EERQALISQL NSLAGKPFFL KDHLRSFSLC
181 SMTRMVLSNK YFGESTVRVE DLQYLVDQWF LLNGAFNIGD WIPWLSFLDL QGYVKQMKAL
241 KRTFDKFHNI VLDDRRAKKN AEKNFVPKDM VDVLLKMAED PNLEVKLND CVKGLMQDLL
301 TGGTDSLTA VQWAFQELLR RPRVIEKATE ELDRIVGKER WVEEKDCSQL SYVEAILKET
361 LRLHPLGTML APHCAIEDCN VAGYDIQKGT TVLVNVWTIG RDPKYWDRAQ EFLPERFLEN
421 DIDMDGHNFA FLPGSGRRR CPGYSLGLKV IRVTIANMLH GFNWKLPEGM KPEDISVEEH
481 YGLTTHPKFP VPVILESRLS SDLYSPIT

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FIG. 120

61/111

NAME D224-BD11  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 239

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1 CTCATTATCC ATCACCTAAA ATGGAGAATT CTTGGGTTTT TCTAGCCTTG GCAGGGCTAT
61 CTGCATTAGC TTTTCTCTGT AAAATAATCA CCTGTCGAAG ACCGGTTAAC CGGAAAATAC
121 CACCAGGTCC AAAACCATGG CCCATCATTG GCAATTTGAA CCTACTTGGT CCTATACCAC
181 ATCAATCTTT TGACTTGCTT TCCAAAAAAT ATGGAGAGTT GATGCTGCTG AAATTTGGCT
241 CCAGGCCAGT TCTTGTGCT TCATCTGCTG AAATGGCAAA ACAGTTTTTA AAAGTACATG
301 ATGCTAATTT CGCCTCCCGT CCTATGCTAG CTGGTGGAAA GTATACAAGC TATAACTATT
361 GTGACATGAC ATGGGCACCC TATGGTCCCT ATTGGCGCCA AGCACGACGA CGAATTTACC
421 TTAACCAGAT ATTTACTCCG AAAAGGCTAG ACTCGTTCGA GTACATTTCG GTTGAAGAAA
481 GGCAGGCCCT GATTTCCTAG CTGAATTCCT TTGCTGGAAA GCCATTTTTT CTCAAAGACC
541 ATTTGTGCGC ATTTAGCCTC TGCAGCATGA CAAGGATGGT TTTGAGCAAC AAGTATTTTG
601 GTGAATCAAC AGTTAGAGTA GAAGATTTGC AGTACCTGGT AGATCAATGG TTCTTACTTA
661 ATGGTGCTTT CAACATTGGA GATTGGATTG CATGGCTCAG CTTCTTGGAC CTACAAGGCT
721 ATGTGAAACA AATGAAGGCT TTGAAAAGAA CTTTTGATAA GTTCCACAAC ATTGTGCTAG
781 ATGATCACAG GGCTAAGAAG AATGCAGAGA AGAACTTTGT CCCAAAAGAC ATGGTTGATG
841 TCTTGTTGAA GATGGCTGAA GATCCTAATC TGGGAAGTAA ACTCACTAAT GACTGTGTCA
901 AAGGGTTAAT GCAGGATTTA CTAAGTGGAG GAACAGATAG CTTAACAGCA GCAGTGCAAT
961 GGGCATTTC AAGAACTTCT AGACAGCCAA GGGTTATTGA GAAGGCAACC GAAGAGCTTG
1021 ACCGGATTGT CGGGAAAGAG AGATGGGTAG AAGAGAAAGA TTGCTCGCAG CTATCTTACG
1081 TTGAAGCAAT CCTCAAGGAA AACTAAGGT TACATCCTCT AGGAACATATG CTAGCACCGC
1141 ATTGTGCTAT AGAAGATTGT AACGTGGCTG GTTATGACAT ACAGAAAGGA ACGACCGTTC
1201 TGGTGAATGT TTGGACCATT GGAAGGGACC CAAAATACTG GGATAGAGCA CAAGAGTTTC
1261 TCCCCGAGAG ATTCTTAGAG AACGACATTG ATATGGACGG ACATAACTTT GCTTTCTTGC
1321 CATTTGGCTC GGGGCGAAGG AGGTGCCCTG GCTATAGCCT TGGACTTAAG GTTATCCGAG
1381 TAACATTAGC CAACATGTTG CATGGATTCA ACTGGAAATT ACCTGAAGGT ATGAAGCCAG
1441 AAGATATAAG TGTGGAAGAA CATTATGGGC TCACTACACA TCCTAAGTTT CCTGTTCCCTG
1501 TGATCTTGGG ATCTAGACTT TCTTCAGATC TCTATTCCCC CATCACTTAA TCCTAAGTGC
1561 TTCCTATTAT AGCATCATAT CAATATCCCT C

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SEQ. ID. NO. 240

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1 MENSUVFLAL AGLSALAFLC KIITCRRPVN RKIPPGPKPW PIIGNLNLG PIPHQSFDLL
61 SKKYGELMLL KFGSRPVLVA SSAEMAKQFL KVHDANFASR PMLAGGKYTS YNYCDMTWAP
121 YGPYWRQARR RIYLNQIFTP KRLDSFEYIR VEERQALISQ LNSLAGKPF LKDHLSRFSL
181 CSMTRMVL SN KYFGESTVRV EDLQYLVQW FLLNGAFNIG DWIPWLSFLD LQGYVKQMK
241 LKRTFDKFHN IVLDDHRAK NAEKNFV PKD MVDVLLKMAE DPNLEVKL TN DCVKGLMQDL
301 LTGGTDSLTA AVQWAFQELL RQPRVIEKAT EELDRIVGKE RWVEEKDCSQ LSYVEAILKE
361 TLRLHPLGTM LAPHCAIEDC NVAGYDIQKG TTVLVNVWTI GRDPKYWDRA QEFLPERFLE
421 NDIDMDGHNF AFLPFGSGRR RCPGYSGLGK VIRVTLANML HGFNWKLP EG MKPEDISVEE
481 HYGLTTHPKF PVPVILESRL SSDLYSPIT

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FIG. 121

NAME D228-AD7  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 241

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1 TGATAATGCT CTTTCTACTC TTTGTAGCCC TTCCTTTCAT TCTTATTTTT CTCTTCCTA
61 AATTCAAAAA TGGTGGAAAT AACAGATTGC CACCAGGTCC TATAGGTTTA CCATTCATTG
121 GAAATTTGCA TCAATACGAT AGTATAAATC CTCATATCTA TTTTGGGAAA CTTTCAAAAA
181 AATATGGCAA AATCTTCTCA TTA AAAACTTG CTTCTACTAA TGTGGTAGTA GTTCTTCAG
241 CAAAATTAGC AAAAGAAGTA TTGAAAAAAC AAGATTTAAT ATTTTGTAGT AGACCATCTA
301 TTCTTGGCCA ACAAAAACTG TCTTATTATG GTCGTGATAT TGCTTTTAAT GATTATTGGA
361 GAGAAATGAG AAAAATTTGT GTTCTTCATC TTTTTAGTTT AAAAAAGTT CAATTATTTA
421 GTCCAATTCG TGAAGATGAA GTTTT TAGAA TGATTAAGAA AATATCAAAA CAAGCTTCTA
481 CTTCACAAAT TATTAATTTG AGTAATTTAA TGATTTTCATT AACAAGTACA ATTATTTGTA
541 GAGTTGCTTT TGGTGT TAGG ATTGAAGAAG AAGCACATGC AAGGAAGAGA TTTGATTTTC
601 TTTTGGCCGA GGCACAAGAA ATGATGGCTA GTTCTTTTGT ATCTGATTTT TTTCCCTTTT
661 TAAGTTGGAT TGATAAATTA AGTGGATTGA CATATAGACT TGAGAGGAAT TTCAAGGATT
721 TGGATAATTT TTATGAAGAA CTCATTGAGC AACATCAAAA TCCTAATAAG CCAAATATA
781 TGGAAGGAGA TATTGTTGAT CTTTGTGCTAC AATTGAAGAA AGAGAAATTA ACACCACTTG
841 ATCTCACTAT GGAAGATATA AAAGGAATTC TCATGAATGT GTTAGTTGCA GGATCAGACA
901 CTAGTGCAGC TGCTACTGTT TGGGCAATGA CAGCCTTGAT AAAGAATCCT AAAGCCATGG
961 AAAAAGTTCA ATTAGAAATC AGAAAAATCAG TTGGGAAGAA AGGCATTGTA AATGAAGAAG
1021 ATGTCCAAAA CATCCCTTAT TTTAAAGCAG TGATAAAGGA AATATTTAGA TTGTATCCAC
1081 CAGCTCCACT TTTAGTTCCA AGAGAATCAA TGGAAAAAAC CATATTAGAA GGTATGAAA
1141 TTCGGCCAAG AACCATAGTT CATGTTAACG CTTGGGCTAT AGCAAGGGAT CCTGAAATAT
1201 GGGAAAATCC AGATGAATTT ATACCTGAGA GATTTTTTGAA TAGCAGTATC GATTACAAGG
1261 GTCAAGATTT TGAGTTACTT CCATTTGGTG CAGGCAGAAG AGGTTGCCCA GGTATTGCAC
1321 TTGGGGTTGC ATCCATGGAA CTTGCTTTGT CAAATCTTCT TTATGCATTT GATTGGGAGT
1381 TGCCTTATGG AGTAAAAAAA GAAGACATCG ACACAAACGT TAGGCCTGGA ATTGCCATGC
1441 ACAAGAAAAA CGAACTTTGC CTTGTCCCAA AAAATTATTT ATAAATTATA TTGGGACGTG
1501 GATCTCATGC TAGTTCTGTG CGGTCAGCTA AGCTTATTAT TTTTGGCTCA AATTATGTAT
1561 ACATAATTAG TACATGTTTA AAATGTATAA ATATAGTAGA ACCATTCTCA TGGTT

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SEQ. ID. NO. 242

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1 MLFLLFVALP FILIFLLPKF KNNGNRLPP GPIGLPFIGN LHQYDSITPH IYFWKLSKKY
61 GKIFSLKLAS TNVVVVSSAK LAKEVLKKQD LIFCSRPSIL GQOKLSYYGR DIAFN DYWRE
121 MRKICVLHLF SLKKVQLFSP IREDEVFRMI KKISKQASTS QIINLSNLM SLTSTIICRV
181 AFGVRIEEEA HARKRFDLL AEAQEMMASF FVSDFFPFLS WIDKLSGLTY RLERNFKDLD
241 NFYEELIEQH QNPKNPKYME GDIVDLLLQL KKEKLTPLDL TMEDIKGILM NVLVAGSDTS
301 AAATVWAMTA LIKNPKAMEK VQLEIRKSVG KKGIVNEEDV QNIPYFKAVI KEIFRLYPPE
361 PLLVPRESME KTILEGYEIR PRTIVHVN AW AIARDPEIWE NPDEFIPERF LNSSIDYKGO
421 DFELLFPFAG RRGCPGIALG VASMELALSN LLYAFDWELP YGVKKEDIDT NVRPGIAMHK
481 KNELCLVPKN YL

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FIG. 122

NAME D228-AH8  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 243

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1 TGATAATGCT CTTTCTACTC TTTGTAGCCC TTCCTTTCAT TCTTATTTTT CTCTTCCTA
61 AATTCAAAAA TGGTGGAAAT AACAGATTGC CACCAGGTCC TATAGGTTTA CCATTCATTG
121 GAAATTTGCA TCAATATGAT AGTATAACTC CTCATATCTA TTTTGGGAAA CTTTCCAAAA
181 AATATGGCAA AATCTTCTCA TTAAGAACTG CTTCTACTAA TGTGGTAGTA GTTCTTCAG
241 CAAAATTAGC AAAAGAAGTA TTGAAAAAAC AAGATTTAAT ATTTTGTAGT AGACCATCTA
301 TTCTTGGCCA ACAAAAAGTG TCTTATTATG GTCGTGATAT TGCTTTTGCA CCTTATAATG
361 ATTATTGGAG AGAAATGAGA AAAATTTGTG TTCTTCATCT TTTTAGTTTA AAAAAAGTTC
421 AATTATTAG TCCAATTCGT GAAGATGAAG TTTTGAAGAT GATTAAAGAA ATATCAAAAC
481 AAGCTTCTAC TTCACAAATT ATTAATTTGA GTAATTTAAT GATTTTCATTA ACAAGTACAA
541 TTATTTGTAG AGTTGCTTTT GGTGTTAGGT TTGAAGAAGA AGCACATGCA AGGAAGAGAT
601 TTGATTTTCT TTTGGCCGAG GCACAAGAAA TGATGGCTAG TTTCTTTGTA TCTGATTTTT
661 TTCCCTTTTT AAGTTGGATT GATAAATTAA GTGGATTGAC ATATAGACTT GAGAGGAATT
721 TCAAGGATTT GGATAATTTT TATGAAGAAC TCATTGAGCA ACATCAAAAT CCTAATAAGC
781 CAAAATATAT GGAAGGAGAT ATTGTTGATC TTTTGCTACA ATTGAAGAAA GAGAAATTAA
841 CACCACCTGA TCTCACTATG GAAGATATAA AAGGAATTCT CATGAATGTG TTAGTTGCAG
901 GATCAGACAC TAGTGCAGCT GCTACTGTTT GGGCAATGAC AGCCTTGATA AAGAATCCTA
961 AAGCCATGGA AAAAGTTCAA TTAGAAATCA GAAAATCAGT TGGGAAGAAA GGCATTGTAA
1021 ATGAAGAAGA TGTCCAAAAC ATCCCTTATT TTAAAGCAGT GATAAAGGAA ATATTTAGAT
1081 TGTATCCACC AGCTCCACTT TTAGTTCCAA GAGAATCAAT GGAAAAAACC ATATTAGAAG
1141 GTTATGAAAT TCGGCCAAGA ACCATAGTTC ATGTTAACGC TTGGGCTATA GCAAGGGATC
1201 CTGAAATATG GGAAAATCCA GATGAATTTA TACCTGAGAG ATTTTGAAT AGCAGTATCG
1261 ATTACAAGGG TCAAGATTTT GAGTTACTTC CATTTGGTGC AGGCAGAAGA GGTGCCCAG
1321 GTATTGCACT TGGGGTTGCA TCCATGGAAC TTGCTTTGTC AAATCTTCTT TATGCATTTG
1381 ATTGGGAGTT GCCTTATGGA GTGAAAAAAG AAGACATCGA CACAAACGTT AGGCCTGGAA
1441 TTGCCATGCA CAAGAAAAAC GAACCTTGCC TTGTCCCAA AAATTATTTA TAAATTATAT
1501 TGGGACGTGG ATCTCATGCT AGTTCTGTGC GGTCAGCTAA GCTTATTATT TTTGGCTCAA
1561 ATTATGTATA CATAATTAGT ACATGTTTAA AATGTATAAA TATAGTAGAA CCATTCTCAT
1621 GGT

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SEQ. ID. NO. 244

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1 MLFLLFVALP FILIFLLPKF KNNGNNRLPP GPIGLPFIGN LHQYDSITPH IYFWKLSKKY
61 GKIFSLKLAS TNVVVVSSAK LAKEVLKKQD LIFCSRPSIL GQOKLSYYGR DIAFAPYNDY
121 WREMRKICVL HLFSLKKVQL FSPIREDEVF RMIKKISKQA STSQIINLSN LMISLTSTII
181 CRVAFGVRFE EEAHARKRFD FLLAEAQEMM ASFFVSDFFP FLSWIDKLSG LTYRLERNFK
241 DLNDFYEELI EQHQNPKNPK YMEGDIVDLL LQLKKEKLT LDLTMEDIKG ILMNVLVAGS
301 DTSAAATVWA MTALIKNPKA MEKVQLEIRK SVGKKGIVNE EDVQNIPIYFK AVIKEIFRLY
361 PPAPLLVPRE SMEKTILEGY EIRPRTIVHV NAWAIARDPE IWENPDEFIP ERFNLSSIDY
421 KGQDFELLFP GAGRRGCPGI ALGVASMELA LSNLLYAFDW ELPYGVKKED IDTNVRPGIA
481 MHKKNELCLV PKNYL

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FIG. 123

NAME D235-AB1  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 245

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1 AAAATTCATA ATGGTTTTTC CCATAGAAGC CTTTGTAGGA CTAGTAACCT TCACATTTCT
61 CTTATACTTC CTATGGACAA AAAAATCTCA AAAACTTCCA AAACCCTTAC TACCGAAAAAT
121 CCCCCGAGGA TGGCCGGTAA TCGGCCATCT TTTTCACTTC AATAACGACG GCGACGACCG
181 TCCATTAGCT CGAAAACCTCG GAGACTTAGC TGATAAATAC GGCCCCGTTT TCACTTTTCG
241 GCTAGGTCTT CCCCTTGTGC TAGTTGTAAG CAGTTACGAA GCTATAAAAG ATTGCTTCTC
301 TACAAATGAC GCCATTTTCT CCAATCGTCC AGCTTTTCTT TACGGCGAAT ACCTTGGCTA
361 CAATAATACA ATGCTTTTTT TAGCAAATTA CGGACCTTAC TGGCGAAAAA ATCGTAAATT
421 AGTCATTTCAG GAAGTTCTCT CTGCTAGTCG TCTCGAAAAA TTCAAACAAG TGAGATTCAC
481 CAGAAATCAA ACGAGCATTA AGAATTTATA CACTCGAATT AATGGAAATT CGAGTACGAT
541 AAATCTAACT GATTGGTTAG AAGAATTGGA TTTTGGTCTG ATCGTGAAAA TGATCGCTGG
601 GAAAAATTAT GAATCCGGTA AAGGAGATGA ACAAGTGGAA AGATTTAAGA ATGCGTTTAA
661 GGATTTTATG GTTTTATCAA TGGGAATTTGT ATTATGGGAT GCATTTCCAA TTCCATTATT
721 TAAATGGGTG GATTTTCAAG GTCATATTAA GGCAATGAAA AGGACATTTA AGGATATAGA
781 TTCTGTTTTT CAGAACTGGT TAGAGGAACA TATTAATAAA AGAGAAAAAA TGGAGGTTGG
841 TGCAGAAGGG AATGAACAAG ATTTTCATTGA TGTGGTGCTT TCAAAATTGA GTAAAGAATA
901 TCTTGATGAA GGTTACTCTC GTGATACTGT CATTAAAGCA ACAGTTTTTA GTTGGTCTT
961 GGATGCAGCA GACACAGTTG CTCTTCACAT AAATTGGGGA ATGACATTAT TGATAAACAA
1021 TCAAAATGCC TTGATGAAAG CACAAGAAGA GATAGACACA AAAGTTGGTA AGTATAGATG
1081 GGTAGAAGAG AGTGATATTA AGGATTTAGT ATACCTCCAA GCTATTGTTA AAAAGGTGTT
1141 ACGATTATAT CCACCAGGAC CTTTGTAGT ACCACATGAA TATGTAAAGG ATTGTGTTGT
1201 TAGTGGATAT CACATTCCTA AAGGGACTAG ATTATTCGCA AACGTCATGA AACTGCAGCG
1261 CGATCCTAAA CTCTTGTCAA ATCCTGATAA GTTCGATCCA GAGAGATTCA TCGCTGGTGA
1321 TATCGACTTC CGTGGTCACC ACTATGAGTT TATCCCATTT GGTTCTGGAA GACGATCTTG
1381 TCCGGGGATG ACTTATGCAT TGCAAGTGGA ACACCTAACA ATGGCACATT TAATCCAGGG
1441 TTTCAATTAC AAAACTCCAA ATGACGAGGC CTTGGATATG AAGGAAGGTG CAGGCATAAC
1501 AATACGTAAG GTAAATCCGG TGGAATTGAT AATAACGCCT CGCTTGGCAC CTGAGCTTTA
1561 CTAAACCTA AGATCTTTCA TCTTGTTGA TCATTGTTTA ATACTCCTAG ATAGATGGGT
1621 ATTCATC

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SEQ. ID. NO. 246

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1 MVFPIEAFVG LVTFTFLLYF LWTKKSQKLP KPLLKPPIPGG WPVIGHLHFH NNDGDDRPLA
61 RKLGLADKY GPVFTFRLGL PLVLVSSYE AIKDCFSTND AIFSNRPAFL YGEYLGYNNT
121 MLFLANYGPY WRKNRKLVIQ EVLSASRLEK FKQVRFTRI QTSKNLYTRI NGNSSTINLT
181 DWLEELDFGL IVKMIAGKNY ESGKGDEQVE RFKNAFKDFM VLSMEFVLWD AFPIPLFKWV
241 DFQGHKAMK RTFKDIDSVF QNWLEEHINK REKMEVGAEG NEQDFIDVVL SKLSKEYLDE
301 GYSRDTVIKA TVFSLVLDAA DTVALHINWG MTLINNNQNA LMKAEEDT KVGKYRWVEE
361 SDIKDLVYLQ AIVKKVLRLY PPGPLLPHE YVKDCVVSGY HIPKGTRLFA NVMKLQRPK
421 LLSNPDKFDP ERFIAGDIDF RGHHYEFIPF GSGRRSCPGM TYALQVEHLT MAHLIQGFNY
481 KTPNDEALDM KEGAGITIRK VNPVELIITP RLAPELY

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FIG. 124

NAME D243-AA2  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 247

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1 CAAAAAATCA TTTCTCTCGT CTAAAATGGA TCTTCTCTTA CTAGAGAAGA CCTTAATTGG
61 TCTTTTCTTT GCCATTTTAA TCGCTTTAAT TGTCTCTAAA CTTCGTTCAA AGCGTTTAA
121 GCTTCCTCCA GGACCAATTC CAGTACCAAG TTTTGGAAT TGGCTTCAAG TTGGTGATGA
181 TTTAAACCAC AGAAATCTTA CTGATTATGC CAAAAAATTT GGCGATCTTT TCTTGTTAAG
241 AATGGGTCAA CGTAACTTAG TTGTTGTGTC ATCTCCTGAA TTAGCTAAAG AAGTTTACAA
301 CACACAAGGT GTTGAATTTG GTTCAAGAAC AAGAAATGTT GTGTTTGATA TTTTACTGAG
361 AAAAGGTCAA GATATGGTTT TTAATGTATA TGGTGAACAT TGGAGAAAAA TGAGGAGAAT
421 TATGACTGTA CCATTTTTTA CTAATAAAGT TGTGCAACAG TATAGAGGGG GGTGGGAGTT
481 TGAGGTGGCA AGTGTAATTG AGGATGTGAA AAAAAATCCT GAATCTGCTA CTAATGGGAT
541 CGTATTAAGG AGGAGATTAC AATTAATGAT GTATAATAAT ATGTTTAGGA TTATGTTTGA
601 TAGGAGATTT GAGAGTGAAG ATGATCCTTT GTTTGTTAAG CTTAAGGCTT TGAATGGTGA
661 AAGGAGTAGA TTGGCTCAAA GTTTTGAGTA TAATTATGGT GATTTTATTC CAATTTTGAG
721 GCCTCTTTTG AGAGGTTATT TGAAGATCTG TAAAGAAGTT AAGGAGAAGA GGCTGCAGCT
781 TTTCAAAGAT TACTTTGTTG ATGAAAGAAA GAAGCTTTCA AATACCAAGA GCTCGGACAG
841 CAATGCCCTA AAATGTGCGA TTGATCACAT TCTTGAGGCT CAACAGAAGG GAGAGATCAA
901 TGAGGACAAC GTTCTTTTACA TTGTTGAAAA CATCAATGTT GCTGCAATTG AAACAACATT
961 ATGGTCAATT GAGTGGGGTA TCGCCGAGCT AGTCAACCAC CCTCACATCC AAAAGAACT
1021 GCGCGACGAG ATTGACACAG TTCTTGGACC AGGAGTGCAA GTGACTGAAC CAGACACCCA
1081 CAAGCTTCCA TACCTTCAGG CTGTGATCAA GGAGGCACTT CGTCTCCGTA TGGCAATTCC
1141 TCTATTAGTC CCACACATGA ACCTTCACGA CGCAAAGCTT GGCGGGCTTG ATATTCCAGC
1201 AGAGAGCAAA ATCTTGTTA ACGCTTGGTG GTTAGCTAAC AACCCGGCTC ATTGGAAGAA
1261 ACCCGAAGAG TTCAGACCCG AGAGGTTCTT TGAAGAGGAG AAGCATGTTG AGGCCAATGG
1321 CAATGACTTC AGATATCTTC CGTTTGGCGT TGGTAGGAGG AGCTGCCCTG GAATTATACT
1381 TGCATTGCCA ATTCTTGCCA TCACCTTGGG ACGTTTGGTT CAGAACTTTG AGCTGTTGCC
1441 TCCTCCAGGC CAGTCGAAGC TCGACACCAC AGAGAAAGGT GGACAGTTCA GTCTCCACAT
1501 TTTGAAGCAT TCCACCATTG TGTTGAAACC AAGGTCTTTC TGAACCTTGT GATCTTATTA
1561 ATTAAGGGGT TCTGAAGAAA TTTGATAGTG TTGG

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SEQ. ID. NO. 248

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1 MDLLLLLEKTL IGLFFAILIA LIVSKLRSKR FKLPPGPIPV PVFGNWLOVG DDLNHRNLTD
61 YAKKFGDLFL LRMGQRNLVV VSSPELAKEV LHTQGVFEFGS RTRNVVFDIF TGKGQDMVFT
121 VYGEHWRKMR RIMTVPFFTN KVVQYRGGW EFEVASVIED VKKNPESATN GIVLRRRLQL
181 MMYNNMFRIM FDRRFESEDD PLFVKLKALN GERSRLAQSF EYNYGDFIPI LRPLLRGYLK
241 ICEVKEKRL QLFKDYFVDE RKKLSNTKSS DSNALKCAID HILEAQQKGE INEDNVLYIV
301 ENINVAAIET TLWSIEWGIA ELVNHPIQK KLRDEIDTVL GPGVQVTEPD THKLPLYLQAV
361 IKEALRLRMA IPLLPHMNL HDAKLGGLDI PAESKILVNA WWLANNPAHW KKPEEFRPER
421 FFEKEKHVEA NGNDFRYLPF GVGRRSCPFI ILALPILGIT LGRLVQNFEL LPPPGQSKLD
481 TTEKGGQFSL HILKHSTIVL KPRSF

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FIG. 125

NAME D244-AD4  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 249

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1 AACATTTTGC AATATAGTTT TCCTAGTCAG TTCTAGCCTC CTTTTCCTTA GAAATAATGG
61 ATTATCATAT TTCTTTCCAT TTTCAAGCTC TTTTAGGGCT TTTAGCCTTT GTGTTCTTGT
121 CTATTATCTT ATGGAGAAGA ACACTCACTT CAAGAAAATT AGCCCCTGAA ATCCCAGGGG
181 CATGGCCTAT TATAGGCCAT CTTGCTCAGC TGAGTGGTAC TGATAAGAAT ATCCCATTTC
241 CCCGAATATT GGGCGCTTTG GCAGATAAAT ATGGACCTGT CTTCACTG AGAATAGGGA
301 TGTACCCCTA TTTGATTGTC AACAATTGGG AAGCAGCTAA GGATTGTCTC ACAACGCATG
361 ATAAGGACTT CGCTGCCCGA CCAACTTCTA TGGCTGGTGA AAGCATCGGG TACAAGTATG
421 CGAGGTTTAC TTATGCTAAT TTTGGTCCTT ATTATAACCA AGTGCGCAAA CTAGCCCTAC
481 AACATGTACC CTCGAGTACT AAACCTGAGA AAATGAAACA CATACGTGTT TCTGAATTGG
541 AAAC TAGCAT CAAAGAATTA TATTCTTTGA CGCTGGGCAA AAACAACATG CAAAAAGTGA
601 ATATAAGTAA ATGGTTTGAA CAATTGACTT TAAACATAAT CGTGAAGACA ATTTGTGGCA
661 AGAGATATAG CAACATAGAG GAGGATGAAG AGGCACAACG TTTCAGAAAG GCATTTAAGG
721 GCATCATGTT TGTGTAGGG CAAATTGTTT TATATGACGC AATTCCATT CATTGTTCA
781 AATACTTTGA TTTCCAAGGT CATATACAAT TGATGAACAA AATTTATAAA GACTTAGATT
841 CTATTCTTCA AGGATGGTTG GATGATCATA TGATGAACAA GGATGTAAAC AATAAGGATC
901 AAGATGCCAT AGATGCCATG CTTAAGGTAA CACAACCTAA TGAATTCAAA GCCTATGGTT
961 TTTCTCAGGC CACTGTGATC AAGTCGACAG TCTTGAGTTT GATCTTAGAT GGAAATGACA
1021 CAACCGCTGT TCATTTGATA TGGGTAAATGT CCTTATTACT GAACAATCCA CATGTTATGA
1081 AACCAAGGCCA AGAAGAGATA GACATGAAAG TGGGTAAAGA GAGGTGGATT GAAGATACTG
1141 ACATAAAAAA TTTAGTGTAC CTTCAGGCTA TCGTTAAAGA GACATTGCGC TTGTATCCAC
1201 CTGTTCTTTT TCTTTTACCA CACGAAGCAG TGCAAGATTG TAAAGTGACT GGTACCACA
1261 TTCCTAAAGG TACTCGTCTA TATATCAATG CGTGGAAAGT ACATCGCGAT CCTGAAATTT
1321 GGTGAGAGCC CGAAAAGTTT ATGCCCAATA GATTCTTGAC TAGCAAAGCA AATATAGATG
1381 CTCGCGGTCA AAATTTTGAA TTTATACCGT TTGGTTCTGG GAGACGGTCA TGTCCAGGGA
1441 TAGGTTTTTG GACTTTAGTG ACACATCTGA CTTTGGTTCG CTTGCTTCAA GGTTTTGATT
1501 TTAGTAAGCC ATCAAACACG CCAATTGACA TGACAGAAGG CGTAGGCGTT ACTTTGCCTA
1561 AGGTTAATCA AGTTGAAGTT CTAATTACCC CTCGTTTACC TTCTAAGCTT TATTTATTTT
1621 GAAAGTGCAA ATCATCAATC ATGGCTTGAG TAATTAGTTA TACTTTAATA TGTTTCTC

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SEQ. ID. NO. 250

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1 MDYHISFHFQ ALLGLLAFVF LSIILWRRTL TSRKLAPEIP GAWPIIGHLR QLSGTDKNIP
61 FPRILGALAD KYGPVFTLRI GMPYLVNN WEAAKDCLT HDKDFAARPT SMAGESIGYK
121 YARETYANFG PYYNQVRKLA LQHVPSSTKL EKMKHVRVSE LETSIKELYS LTLGKNMQK
181 VNISKWFEQL TLNIIIVKTIC GKRYSNIEED EEAQRFRKAF KGIMFVVGQI VLYDAIPFPL
241 FKYFDFQGHI QLMNKIYKDL DSILQGWLDD HMMNKDVNNK DQDAIDAMLK VTQLNEFKAY
301 GFSQATVIKS TVLSLILDGN DTTAVHLI WV MSLLLNNPHV MKQGQEEIDM KVGKERWIED
361 TDIKNLVYLQ AIVKETLRLY PPVPFLLPHE AVQDCKVTGY HIPKGTRLYI NAWKVHRDPE
421 IWSEPEKEMP NRFLTSKANI DARGQNFEEI PFGSGRRSCP GIGFATLVTH LTFGRLLQGF
481 DFKPSNTPI DMTEGVGVTL PKVNQVEVLI TPRLPSKLYL F

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FIG. 126

NAME D247-AH1  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 251

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1 TGATAATGCT CTTTCTACTC TTTGTAGCCC TTCCTTTCAT TCTTATTTTT CTTCTTCCTA
61 AATTCAAAAA TGGTGGAAAT AACAGATTGC CACCAGGTCC TATAGGTTTA CCATTCATTG
121 GAAATTTGCA TCAATATGAT AGTATAACTC CTCATATCTA TTTTGGGAAA CTTTCCAAAA
181 AATATGGCAA AATCTTCTCA TTA AAACTTG CTTCTACTAA TGTGGTAGTA GTTCTTCAG
241 CAAAATTAGC AAAAGAAGTA TTGAAAAAAC AAGATTTAAT ATTTTGTAGT AGACCATCTA
301 TTCTTGGCCA ACAAAAACTG TCTTATTATG GTCGTGATAT TGCTTTTGCA CCTTATAATG
361 ATTATTGGAG AGAAATGAGA AAAATTTGTG TTCTTCATCT TTTTAGTTTA AAAAAAGTTC
421 AATTATTTAG TCCAATTCGT GAAGATGAAG TTTTGAAT GATTAAGAAA ATATCAAAAC
481 AAGCTTCTAC TTCACAAAT ATTAAATTTGA GTAATTTAAT GATTTCATTA ACAAGTACAA
541 TTATTTGTAG AGTTGCTTTT GGTGTTAGGT TTGAAGAAGA AGCACATGCA AGGAAGAGAT
601 TTGATTTTCT TTTGGCCGAG GCACAAGAAA TGATGGCTAG TTTCTTTGTA TCTGATTTTT
661 TTCCCTTTTT AAGTTGGATT GATAAATTAA GTGGATTGAC ATATAGACTT GAGAGGAATT
721 TCAAGGATTT GGATAATTTT TATGAAGAAC TCATTGAGCA ACATCAAAAT CCTAATAAGC
781 CAAAATATAT GGAAGGAGAT ATTGTTGATC TTTTGCTACA ATTGAAGAAA GAGAAATTAA
841 CACCATTGA TCTCACTATG GAAGATATAA AAGGAATTCT CATGAATGTG TTAGTTGCAG
901 GATCAGACAC TAGTGCAGCT GCTACTGTTT GGGCAATGAC AGCCTTGATA AAGAATCCTA
961 AAGCCATGGA AAAAGTTCAA TTAGAAATCA GAAAATCAGT TGGGAAGAAA GGCATTGTAA
1021 ATGAAGAAGA TGTCCAAAAC ATCCCTTATT TTAAAGCAGT GATAAAGGAA ATATTTAGAT
1081 TGTATCCACC AGCTCCACTT TTAGTTCCAA GAGAATCAAT GGAAAAAACC ATATTAGAAG
1141 GTTATGAAAT TCGGCCAAGA ACCATAGTTC ATGTTAACGC TTGGGCTATA GCAAGGGATC
1201 CTGAAATATG GGAAAATCCA GATGAATTTA TACCTGAGAG ATTTTGAAT AGCAGTACCG
1261 ATTACAAGGG TCAAGATTTT GAGTTACTTC CATTGGGTGC AGGCAGAAGA GGTGCCCCAG
1321 GTATTGCACT TGGGGTTGCA TCCATGGAAC TTGCTTTGTC AAATCTTCTT TATGCATTTG
1381 ATTGGGAGTT GCCTTATGGA GTGAAAAAAG AAGACATCGA CACAAACGTT AGGCCTGGAA
1441 TTGCCATGCA CAAGAAAAAC GAACTTTGCC TTGTCCCAA AAATTATTTA TAAATTATAT
1501 TGGGACGTGG ATCTCAATTT AGTTCTGTGA GGTGAGC

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SEQ. ID. NO. 252

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1 MLFLLFVALP FILIFLLPKF KNGGNNRLPP GPIGLPFIGN LHQYDSITPH IYFWKLSKKY
61 GKIFSLKLAS TNVVVVSSAK LAKEVLKKQD LIFCSRPSIL GQQKLSYYGR DIAFAPYNDY
121 WREMRKICVL HLFSLKKVQL FSPIREDEVF RMIKKISKQA STSQIINLSN LMISLTSTII
181 CRVAFGVRFEE EEAHARKRFD FLLAEAQEMM ASFFVSDFFP FLSWIDKLSG LTYRLERNFK
241 DLDNFYEELI EQHQNPKNPK YMEGDIVDLL LQLKKEKLT LDLTMEIKG ILMNVLVAGS
301 DTSAAATVWA MTALIKNPKA MEKVQLEIRK SVGKKGIVNE EDVQNIPIYFK AVIKEIFRLY
361 PPAPLLVPRE SMEKTILEGY EIRPRTIVHV NAWAIARDPE IWENPDEFIP ERFLNSSTDY
421 KGQDFELLPF GAGRRGCPGI ALGVASMELA LSNLLYAFDW ELPYGVKKED IDTNVVRPGIA
481 MHKKNELCLV PKNYL

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FIG. 127

NAME D248-AA6  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 253

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1 CCAAAATCAT GGCTCTATCT TTCATATTCA TATCCATAAC CCTAATTTTT CTAGTTCATA
61 AACTCTACCA CCGTCTTAGA TTCAACTAC CACCAGGTCC GCGGCCGTTA CCGGTGGTCG
121 GAAACCTCTA CGACATAAAA CCGGTGAGAT TCCGGTGCTT TGCCGATTGG GCCAAAACCTT
181 ACGGTCCGAT TTTCTCAGTA TACTTTGGGT CACAGTTAAA TGTTGTGGTA ACAACAGCTG
241 AATTAGCTAA AGAAGTATTG AAAGAAAATG ACCAGAATTT AGCAGATAGA TTTAGGACTA
301 GACCTGCAAA TAATTTGAGC AGAAATGGGA TGGATTTGAT TTGGGCTGAT TATGGGCCTC
361 ATTATGTGAA AGTAAGGAAG CTCTGTAATC TTGAGCTTTT TACTCCTAAA AGACTTGAAG
421 CTCTTAGACC TATTAGAGAA GATGAAGTTA CTGCTATGGT TGAAAACATT TTCAAGGATT
481 GTACTAAGCC TGATAACACA GGTAAAAGCT TGTGATAAG AGAGTACTTA GGATCAGTAG
541 CATTCAACAA CATTACAAGG TTAACATTTG GGAAAAGGTT CATGAACCTA AAAGGTGAGA
601 TTGATGAGCA AGGTCAAGAA TTCAAGGGTA TTGTCTCTAA TGGCATCAAA ATTGGCGGAA
661 AACTTCCCTT GGCAGAGTAT GTTCCATGGC TCCGTTGGTT TTTCACAATG GAAAACGAGG
721 CACTCGTGAA GCACTCTGCA CGTAGAGACC GGTAAACAAG AATGATCATG GATGAACACA
781 CACTGGCTCG CAAGAAAACCT GGTGATACTA AGCAGCATTT TGTGATGCA TTGCTTACTC
841 TTCAGAAGCA GTATGATCTT AGTGATGACA CTGTTATTGG CCTCCTCTGG GATATGATTA
901 CAGCAGGAAT GGACACAACA ACCATAACAG TGGAATGGGC AATGGCAGAA CTAGTTAAGA
961 ACCCAAGAGT GCAACTAAAA GCTCAAGAGG AGCTTGACAG GGTAAATCGGA ACGGATCGAA
1021 TCATGTCAGA AACCGATTTT TCTAAACTTC CTTACCTACA ATGTGTAGCC AAAGAGGCTC
1081 TAAGGTGCA CCCTCCAACCT CCTCTAATGC TTCCTCATAA GGCCAGTGCC AGTGTCAAAA
1141 TTGGTGTTA TGACATTCCT AAGGGGTCCA TCGTGACAGT GAACGTTTGG GCTGTGCTC
1201 GTGACCCAGC CGTGTGGAAG AACCCTTGG AGTTCAGACC AGAGCGCTTC CTTGAGGAAG
1261 ACGTTGACAT GAAGGGTCAC GACTATCGGT TATTGCCCTT TGGTGCAGGA AGGCGTGTCTT
1321 GCCCCGGTGC ACAACTTGCT ATCAACTTGG TCACATCTAT GTTGGGTCAT TTGTTGCATC
1381 ATTTTACATG GGCTCCGGCC CCGGGGGTTA ACCCGGAGGA TATTGACTTG GAGGAGAGCC
1441 CTGGAACAGT AACTTACATG AAAAATCCAA TACAAGCTAT TCCAACCTCA AGATTGCCTG
1501 CACACTTGTA TGGACGTGTG CCAGTGGATA TGTA AACAT TTTGTTCTTT CCCTTTTTTG
1561 TTATATGATG AG

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SEQ. ID. NO. 254

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1 MALSFIFISI TLIFLVHKLY HRLRFKLPPG PRPLPVVGNL YDIKPVRFRFC FADWAKTYGP
61 IFSVYFGSQL NVVVTAEALA KEVLKENDQN LADRFRTRPA NNLSRNGMDL IWADYGPYHV
121 KVRKLCNLEL FTPKRLEALR PIREDEV TAM VENIFKDCTK PDNTGKSLLI REYLGSVAFN
181 NITRLTFGKR FMNSKGEIDE QGQEFKGI VS NGIKIGGKLP LAEYVPWLRW FFTMENEALV
241 KHSARRDRLT RMIMDEHTLA RKKTGDTKQH FVDALLTLQK QYDLSDDTVI GLLWDMITAG
301 MDTTITVWEV AMAELVKNPR VQLKAQEELD RVIGTDRIMS ETDFSKLPYL QCVAKEALRL
361 HPPTPLMLPH KASASVKIGG YDIPKGSIVH VNVWAVARDP AVWKNPLEFR PERFLEEDVD
421 MKGHDYRLLP FGAGRRVCPG AQLAINLVT MLGHLLHHFT WAPAPGVNPE DIDLEESPGT
481 VTVMKNPIQA IPTPRLPAHL YGRVPVDM

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FIG. 128

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NAME D249-AE8  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 255

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1 AATCACTAAT TTTTCATGTAC TCTCATAGGT CAAAAGTTTC AACCAAAATC ATGGCTCTAT
61 CCTTCATATT CATATCCATA ACCCTAATTT TTCTAGTTCA TAAACTCTAC CACCGTCTTA
121 GATTCAAACCT ACCACCAGGT CCGCGGCCGT TACCGGTGGT CGGAAACCTC TACGACATAG
181 AACCGGTGAG ATTCCGGTGC TTTGCCGATT GGGCCAAAAC TTACGGTCCG ATTTTCTCAG
241 TATACTTTGG GTACAGTTA AATGTTGTGG TAACAACAGC TGAATTAGCT AAAGAAGTAT
301 TGAAAGAAAA TGACCAGAAT TTAGCAGATA GATTTAGGAC TAGACCTGCA AATAATTTGA
361 GCAGAAATGG GATGGATTTG ATTTGGGCTG ATTATGGGCC TCATTATGTG AAAGTAAGGA
421 AGCTCTGTAA TCTTGAGCTT TTTACTCCTA AAAGACTTGA AGCTCTTAGA CCTATTAGAG
481 AAGATGAAGT TACTGCTATG GTTGAAAACA TTTTCAAGGA TTGTACTAAG CCTGATAACA
541 CAGGTAAAAG CTTGTTGATA AGAGAGTACT TAGGATCAGT AGCATTCAAC AACATTACAA
601 GGTTAACATT TGGGAAAAGG TTCATGAAC TAAAGGTGA GATTGATGAG CAAGGTCAAG
661 AATTCAAGGG TATTGTCTCT AATGGCATCA AAATTGGCGG AAAACTTCCC TTGGCAGAGT
721 ATGTTCCATG GCTCCGTTGG TTTTTCACAA TGGAAAACGA GGCACCTCGT AAGCACTCTG
781 CACGTAGAGA CCGGTAAACA AGAATGATCA TGGATGAACA CACACTGGCT CGCAAGAAAA
841 CTGGTGATAC TAAGCAGCAT TTTGTGATG CATTGCTTAC TCTTCAGAAG CAGTATGATC
901 TTAGTGATGA CACTGTTATT GGCCTCCTCT GGGATATGAT TACAGCAGGA ATGGACACAA
961 CAACCATAAC AGTGGAATGG GCAATGGCAG AACTAGTTAA GAACCCAAGA GTGCAACTAA
1021 AAGCTCAAGA GGAGCTTGAC AGGGTAATCG GAACGGATCG AATCATGTCA GAAACCGATT
1081 TCTCTAAACT TCCTTACCTA CAATGTGTAG CCAAAGAGGC TCTAAGGTTG CACCCTCCAA
1141 CTCCTCTAAT GCTTCCTCAT AGGGCCAGTG CCAGTGTCAA AATTGGTGGT TATGACATTC
1201 CTAAGGGGTC CATCGTGCAC GTGAACGTTT GGGCTGTCGC TCGTGACCCA GCCGTGTGGA
1261 AGAACCCTGT GGAGTTCAGA CCAGAGCGCT TCCTTGAGGA AGACGTTGAC ATGAAGGGTC
1321 ACGACTATCG GTTATTGCCC TTTGGTGCAG GAAGGCGTGT TTGCCCCGGT GCACAACTTG
1381 CTATCAACTT GGTCACATCT ATGTTGGGTC ATTTGTTGCA TCATTTTACA TGGGCTCCGG
1441 CCCCAGGGGT TAACCCGAG GATATTGACT TGGAGGAGAG CCCTGGAACA GTAACCTACA
1501 TGAAAAATCC AATACAAGCT ATTCCAATC CAAGATTGCC TGCACACTTG TATGGACGTG
1561 TGCCAGTGGA TATGTAAAAC

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SEQ. ID. NO. 256

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1 MYSHRSKVST KIMALSFIFI SITLIFLVHK LYHRLRFKLP PGPRLPVVG NLYDIEPVRF
61 RCFADWAKTY GPIFSVYFGS QLNVVVTAE LAKEVLKEND QNLADRFRTR PANNLSRNGM
121 DLIWADYGPY YVKVRKLCNL ELFTPKRLEA LRPIREDEVT AMVENIFKDC TKPDNTGKSL
181 LIREYLGSVA FNNITRLTFG KRFMNSKGEI DEQQQEFKGI VSNGIKIGGK LPLAEYVPWL
241 RWFFTMENEA LVKHSARRDR LTRMIMDEHT LARKKTGDTK QHFVDALLTL QKQYDLSDDT
301 VIGLLWDMIT AGMDTTTITV EWAMAEVLKN PRVQLKAQEE LDRVIGTDRI MSETDFSKLP
361 YLQCVAKEAL RLHPPTPLML PHRASASVKI GGYDIPKGI VHVNVWAVAR DPAVWKNPLE
421 FRPERFLEED VDMKGHDYRL LPFGAGRRVC PGAQLAINLV TSMLGHLHLLH FTWAPAPGVN
481 PEDIDLEESP GTVTYMKNPI QAIPTRPLPA HLYGRVPVDM

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FIG. 129

NAME D250-AC11  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 257

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1 ATAATGCTCT TTCTACTCTT TGTAGCCCTT CCTTTCATTC TTATTTTCT TCTTCCTAAA
61 TTCAAAAATG GTGGAAATAA CAGATTGCCA CCAGGTCCTA TAGGTTTACC ATTCATTGGA
121 AATTTGCATC AATATGATAG TATAACTCCT CATATCTATT TTTGGAAACT TTCCAAAAAA
181 TATGGCAAAA TCTTCTCATT AAAACTTGCT TCTACTAATG TGGTAGTAGT TTCTTCAGCA
241 AAATTAGCAA AAGAAGTATT GAAAAACAA GATTTAATAT TTTGTAGTAG ACCATCTATT
301 CTTGGCCAAC AAAAAGTGTG TTATTATGGT CGTGATATTG CTTTTCACCC TTATAATGAT
361 TATTGGAGAG AAATGAGAAA AATTTGTGTT CTTCATCTTT TTAGTTTAAA AAAAGTTCAA
421 TTATTTAGTC CAATTCGTGA AGATGAAGTT TTTAGAATGA TTAAGAAAAT ATCAAAACAA
481 GCTTCTACTT CACAAATTAT TAATTTGAGT AATTTAATGA TTTCATTAAC AAGTACAATT
541 ATTTGTAGAG TTGCTTTTGG TGTTAGGTTT GAAGAAGAAG CACATGCAAG GAAGAGATTT
601 GATTTTCTTT TGGCCGAGGC ACAAGAAATG ATGGCTAGTT TCTTTGTATC TGATTTTTTT
661 CCCTTTTAA GTTAGATTGA CAAATTAAGT GGATTGACAT ATAGACTTGA GAGGAATTTT
721 AAGGATTTGG ATAATTTTGA TGAAGAACTC ATTGAGCAAC ATCAAAATCC TAATAAGCCA
781 AAAATATATG AAGGAGATAT TGTTGATCTT TTGCTACAAT TGAAGAAAAG GAAATTAACA
841 CCACTTGATC TCACTATGGA AGATATAAAA GGAATTCTCA TGAATGTGTT AGTTGCAGGA
901 TCAGACACTA GTGCAGCTGC TACTGTTTGG GCAATGACAG CCTTGATAAA GAATCCTAAA
961 GCCATGGAAA AAGTTCAATT AGAAATCAGA AAATCAGTTG GGAAGAAAAG CATTGTAAAT
1021 GAAGAAGATG TCCAAAACAT CCCTTATTTT AAAGCAGTGA TAAAGGAAAT ATTTAGATTG
1081 TATCCACCAG CTCCACTTTT AGTTCCAAGA GAATCAATGG AAAAAACCAT ATTAGAAGGT
1141 TATGAAATTC GGCCAAGAAC CATAGTTCAT GTTAACGCTT GGGCTATAGC AAGGGATCCT
1201 GAAATATGGG AAAATCCAGA TGAATTTATA CCTGAGAGAT TTTTGAATAG CAGTATCGAT
1261 TACAAGGGTC AAGATTTTGA GTTACTTCCA TTTGGTGCAG GCAGAAGAGG TTGCCCAGGT
1321 ATTGCACTTG GGGTTGCATC CATGGAACCT GCTTTGTCAA ATCTTCTTTA TGCATTTGAT
1381 TGGGAGTTGC CTTATGGAGT GAAAAAGAA GACATCGACA CAAACGTTAG GCCTGGAATT
1441 GCCATGCACA AGAAAAACGA ACTTTGCCTT GTCCCAAAA AATTATTTAT AAATTATATT
1501 GGGACGTGGA TCTCATGCTA GTTCTGTGCG GTCAGCTAAG CTTA

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SEQ. ID. NO. 258

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1 MLFLLFVALP FILIFLLPKF KNNGNNRLPP GPIGLPFIGN LHQYDSITPH IYFWKLSKKY
61 GKIFSLKLAS TNVVVVSSAK LAKEVLKKQD LIFCSRPSIL GQQKLSYYGR DIAFAPYNDY
121 WREMRKICVL HLFSLKKVQL FSPIREDEVF RMIKKISKQA STSQIINLSN LMISLTSTII
181 CRVAFGVRFEE EEAHARKREF FLLAEAQEMM ASFFVSDFFP FLS.IDKLSG LTYRLERNFK
241 DLDNFYEELI EQHONPNKPK YMEGDIVDLL LQLKKEKLT LDLTMEIDKG ILMNVLVAGS
301 DTSAAATVWA MTALIKNPKA MEKVQLEIRK SVGKKGIVNE EDVQNIPIYFK AVIKEIFRLY
361 PPAPLLVPRE SMEKTILEGY EIRPRTIVHV NAWAIARDPE IWENPDEFIP ERFLNSSIDY
421 KGQDFELLPF GAGRRGCPGI ALGVASMELA LSNLLYAFDW ELPYGVKKED IDTNVRPGIA
481 MHKKNELCLV PKKLFINYIG TWISC

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FIG. 130

NAME D259-AB9  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 259

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1 CACATTGAGT CCTCTCCCAA ATCACTGATT CACCACCAAA AGTACCAACA ATTCAATGGA
61 AGGTACAAAC TTGACTACAT ATGCAGCAGT ATTTCTTGAT ACTCTGTTTC TTTTGTTCCCT
121 TTCCAAACTT CTTCGCCAGA GGAAACTCAA TTTACCTCCA GGCCCAAAAC CATGGCCGAT
181 CATCGGAAAC TTAAACCTTA TTGGCAATCT TCCTCATCGC TCAATCCACG AACTCTCCCT
241 CAAGTACGGA CCCGTTATGC AACTCCAATT CGGGTCTTTC CCCGTTGTAG TTGGATCCTC
301 CGTCGAAATG GCTAAGATTT TCCTCAAATC CATGGATATT AACTTTGTAG GCAGGCCTAA
361 AACGGCTGCC GGAAAATACA CAACGTACAA TTATTCCGAT ATTACATGGT CTCCTTACGG
421 ACCATATTGG CGCCAGGCAC GTAGGATGTG CCTAACGGAA TTATTCAGCA CGAAACGTCT
481 CGATTCATAC GAGTATATTC GGGCTGAGGA GTTGCAATTCT CTTCTCCATA ATTTGAACAA
541 AATATCAGGG AAACCAATTG TGTGAAAGA TTATTTGACG ACGTTGAGTT TAAATGTTAT
601 TAGCAGGATG GTACTGGGGA AAAGGTATTT GGACGAATCC GAGAATCGT TCGTGAATCC
661 TGAGGAATTT AAGAAGATGT TGGACGAATT GTTTTTGCTA AATGGTGTAC TTAATATTGG
721 AGATTCAATT CCATGGATTG ATTTTCATGA TTTGCAAGGT TATGTTAAGA GGATGAAAGT
781 AGTGAGCAAG AAATTCGACA AGTTTTTAGA GCATGTTATT GATGAGCATA ACATTAGGAG
841 AAATGGAGTG GAGAATTATG TTGCTAAGGA TATGGTGGAT GTTTTGTTGC AGCTTGCTGA
901 TGATCCGAAG TTGGAAGTTA AGCTGGAGAG ACATGGAGTC AAAGCATTCA CTCAGGATAT
961 GCTGGCTGGT GGAACCGAGA GTTCAGCAGT GACAGTGGAG TGGGCAATTT CAGAGCTGCT
1021 AAAGAAGCCG GAGATTTTCA AAAAGGCTAC AGAAGAATTG GATCGAGTAA TTGGGCAGAA
1081 TAGATGGGTA CAAGAAAAGG ACATTCCAAA TCTTCCTTAC ATAGAGGCAA TAGTCAAAGA
1141 GACTATGCCA CTGCACCCCG TGGCACC AAT GTTGGTGCCA CGTGAGTGTC GAGAAGATAT
1201 TAAGGTAGCA GGCTACGACG TTCAGAAAGG AACTAGGGTT CTCGTGAGTG TATGGACTAT
1261 TGGAAGAGAC CCTACATTGT GGGACGAGCC TGAGGTGTTT AAGCCGGAGA GATTCCATGA
1321 AAAGTCCATA GATGTTAAAG GACATGATTA TGAGCTTTTG CCATTGGAG CGGGGAGAAG
1381 AATGTGCCCG GGTTATAGCT TGGGGCTCAA GGTGATTCAA GCTAGCTTAG CTAATCTTCT
1441 ACATGGATTT AACTGGTCAT TGCCTGATAA TATGACTCCT GAGGACCTCA ACATGGATGA
1501 GATTTTTGGG CTCTCTACAC CTAAAAAATT TCCACTTGCT ACTGTGATTG AGCCAAGACT
1561 TTCACCAAAA CTTTACTCTG TTTGATTGAG CAGTTCTATG GTTCCGTCAA GATAG

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SEQ. ID. NO. 260

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1 MEGTNLTYYA AVFLDTLFLF FLSKLLRQRK LNLPPGPKPW PIIGNLNLIG NLPHRSIHEL
61 SLKYGPVMQL QFGSFPVVVG SSVEMAKIFL KSMDINFVGR PKTAAGKYTT YNYS DITWSP
121 YGPYWRQARR MCLTELFSTK RLDSY EYIRA EELHSLHLNL NKISGKPIVL KDYLTTLSLN
181 VISRMVLGKR YLDESENSEFV NPEEFKKMLD ELFLNGVLN IGDSIPWIDF MDLQGYVKRM
241 KVVSKKFDKF LEHVIDEHNI RRNGVENYVA KDMVDVLLQL ADDPKLEVKL ERHGVKAFTQ
301 DMLAGGTESS AVTVEWAISE LLKKPEIFKK ATEELDRVIG QNRWVQEKDI PNLPIEIAIV
361 KETMRLHPVA PMLVPRECRE DIKVAGYDVQ KGTRVLVSVW TIGRDPTLWD EPEVFKPERF
421 HEKSIDVKGH DYELLFPFAG RRMCPGYSLG LKVIQASLAN LLHGFNWSLP DNMT PEDLNM
481 DEIFGLSTPK KFPLATVIEP RLSPKLYSV

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FIG. 131

72/111

NAME D218A-AC2  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 261

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1 CTTCTTCCTT CCTAACTAAA AATGGAGATT CAGTTTTCTA ACTTAGTTGC ATTCTTGCTC
61 TTTCTCTCCA GCATCTTCT TGTATTCAA AAATGGAAAA CCAGAAAACCT AAATTTGCCT
121 CCTGGTCCAT GGAAATTACC TTTTATTGGA AGTTTACACC ATTTGGCTGT GGCAGGTCCA
181 CTTCTCACC ATGGCCTAAA AAATTTAGCC AAACGCTATG GTCCCTTTAT GCATTTACAA
241 CTTGGACAAA TTCCTACACT CGTCATATCA TCACCTCAA TGGCAAAAGA AGTACTAAAA
301 ACTCACGACC TCGCTTTTGC CACTAGACCA AAGCTTGTCG TGGCCGACAT CATTCACTAC
361 GACAGCACGG ACATAGCACT TTCGCCATAC GGTGAATACT GGAGACAAAT TCGTAAATTT
421 TGCATATTGG AACTCTTGAG TGCCAAGATG GTCAAGTTTT TTAGCTCGAT TCGCCAAGAT
481 GAGCTCTCGA AGATGGTTTC ATCTATACGA ACGACGCCCA ATCTCCAGT CAATCTTACC
541 GACAAGATTT TTTGGTTTAC GAGTTCGTA ATTTGTAGAT CAGCTTTAGG GAAGATATGT
601 GGTGACCAAG ACAAATTGAT CATTTTTTATG AGGGAAATAA TATCATTTGGC AGGTGGATTT
661 AGTATTGCTG ATTTTTTCCC TACATGGAAA ATGATTCATG ATATTGATGG TTCAAAATCT
721 AAAGTGGTGA AGGCACATCG TAAGATTGAT GAAATTTTGG AAAATGTGGT AAATGAGCAC
781 AAACAGAATC GAGCAGATGG TAAAAAGGGT AATGGTGAAT TTGGTGGAGA AGATCTGATT
841 GATGTTTTGT TAAGAGTTAG AGAAAGTGGA GAAGTTCAAA TTCCAATCAC AGATGACAAT
901 ATCAAATCAA TATTAATCGA CATGTTCTCT GCCGGATCGG AAACATCATC GACAACTATA
961 ATTTGGGCAT TAGCTGAAAT GATGAAGAAA CCAAGTGTTT TAGCAAAGGC ACAAGATGAA
1021 GTGAGCCAAG CTTTGAAGGG GAAGAAAATT AGTTTTCAAG AGATTGATAT TGATAAGCTA
1081 AAGTATTTGA AGTTAGTGAT CAAAGAACT TTAAGAATGC ACCCTCCAAT TCCTCTGTTA
1141 GTCCCTAGAG AATGTATGGA AGATACAAAG ATTGATGGTT ACAATATACC TTTCAAACA
1201 AGAGTCATTG TTAATGCATG GGCAATTGGA CGAGATCCTC AAAGTTGGGA TGATCCTGAA
1261 AGCTTTACGC CAGAGAGATT TGAGAATAAT TCTATTGATT TTCTTGGAAT TCATCATCAA
1321 TTTATTCCAT TTGGTGCAGG AAGAAGGATT TGTCTTGGA TGCTATTTGG TTTAGCTAAT
1381 GTTGGACAA CTTTAGCTCA GTTACTTTAT CACTTCGATT GGAAACTCCC TAATGGACAA
1441 ACTCACCAAA ATTTTCGACAT GACTGAGTCA CCTGGAATTT CTGCTACAAG AAAGGATGAT
1501 CTTATTTTGA TTGCCACTCC TGCTCATTCT TGATTAAGTA TTGCTGCTTT TCTATTGGAG
1561 AATTTTCAA ATTTCATCCAC AATATATAGT GTTTGCTAGA GTTGTTAGC

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SEQ. ID. NO. 262

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1 MEIQFSNLVA FLLFLSSIFL VFKKWKTRKL NLPPGPWKLP FIGSLHHLAV AGPLPHHGLK
61 NLAKRYGPLM HLQLGQIPTL VISSPQMAKE VLKTHDLAFA TRPKLVVADI IHYDSTDIAL
121 SPYGEYWRQI RKICILELLS AKMVKFFSSI RQDELSKMVS SIRTTPNLPV NLTDKIFWFT
181 SSVICRSALG KICGDQDKLI IFMREIISLA GGFSIADFFP TWKMIHDIDG SKSKLVKAHR
241 KIDEILENVV NEHKQNRADG KKGNGEFGGE DLIDVLLRVR ESGEVQIPIT DDNIKSILID
301 MFSAGSETSS TTIIWALAEM MKKPSVLAKA QAEVSQALKG KKISFQEIDI DKLKYLKLVI
361 KETLRMHPII PLLVPRECM DTKIDGYNIP FKTRVIVNAW AIGRDPQSWD DPESFTPERF
421 ENNSIDFLGN HHQFIPFGAG RRICPGMLFG LANVGQPLAQ LLYHFDWKLP NGQTHQNFDM
481 TESPGISATR KDDLILIA TP AHS

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FIG. 132

NAME D210-BD4  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 263

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1 CTTTCATCAT ATGGCATGAA ATGGGAAATG CTCACAACAG CAAAATTGCA GCAATCTGTT
61 TGATAATTTT CTTGGTATAT AAAGCATGGG AATTGTTGAA GTGGATATGG ATTAAGCCAA
121 AGAAACTGGA GAGTTGCCTC AGAAAACAGG GACTCAAAGG AAATCCTAC GGGCTATTCT
181 ATGGAGATAT GAAAGAATtG TCCAAAAGTC TCAAGGAAAT CAATTCAAAG CCCATCATCA
241 ATCTATCAAA TGAAGTAGCC CCAAGAATCA TTCCTTATtA TCTTGAAATC ATCCAAAAAT
301 ATGGTAAAAG ATGTTTTGTT TGGCAAGGAC CAACCCCGC AATATTAATA ACAGAGCCAG
361 AATTAATAAA GGAGATATTT GGTAAGAACT ATGTTTTTCA GAAGCCTAAT AATCCCAACC
421 CACTGACCAA GTTATTGGCT CGAGGTGTTG TAAGCTACGA GGAAGAAAAA TGGGCAAAAC
481 ACAGAAAGAT CTTAAATCCT GCCTTTCATA TGGAGAAGTT GAAGCATATG CTACCAGCAT
541 TTTACTTGAG CTGTAGTGAG ATGCTGAACA AATGGGAGGA GATTATCCCA GTAAAAGAAT
601 CAAATGAGTT GGACATTTGG CCTCATCTTC AAAGAATGAC AAGTGATGTG ATTTCTCGTG
661 CTGCCTTTGG TAGTAGCTAC GAAGAAGGAA GAAGAATATT TGAACCTCAA GAAGAACAAG
721 CTGAGTATCT AACGAAGACA TTCAAATCAG TTTATATCCC AGGTTCCAGA TTTTTTCCCA
781 ATAAAATGAA CAAAAGAATG AAAGAATGTG AAAAGGAAGT ACGAGAAACA ATTACGTGTC
841 TAATTGACAA CAGATTAAAG GCAAAAGAAG AAGGCAATGG CAAGGCCCTC AATGATGACC
901 TATTGGGTAT ATTATTAGAG TCAAATTCCTA TAGAAATTGA AGAACATGGT AACAAGAAGT
961 TTGGAATGAG TATACCTGAA GTAATTGAAG AGTGCAAATT ATTCTATTTT GCTGGCCAAG
1021 AGACTACATC AGTATTGCTT GTGTGGACAC TGATTTTGTT AGGGAGAAAt cCAGAATGGC
1081 AGGAACGTGC TAGAGAGGAA GTTTTTCAAG CTTTTGGAAG TGATAAACCA ACTTTTGACG
1141 AATTATATCG CTTGAAAATT GTGACGATGA TTTTGTACGA GTCTTTAAGG TTATATCCAC
1201 CAATAGCAAC TCGTACTCGA AGGACTAATG AAGAAACAAA ATTAGGGGAA CTAGATTTAC
1261 CAAAGGGTGC ACTGCTCTTT ATACCAACAA TCTTATTACA TCTTGACAGG GAAATTTGGG
1321 GTGAAGATGC AGATGAGTTC AATCCGGAGA GATTTAGCGA AGGGGTGGCA AAGGCAACAA
1381 AGGGGAAAAT GACATATTTT CCATTTGGTG CAGGACCGCG AAAATGCATT GGGCAAAACT
1441 TCGCGATTTT GGAAGCAAAA ATGGCTATAG CTATGATTCT ACAACGCTTC TCCTTCGAGC
1501 TCTCTCCATC TTATACACAC TCTCCATACA CTGTGGTCAC TTTGAAACCC AAATATGGTG
1561 CTCCCCTAAT AATGCACAGG CTGTAGTCCT GTGAGAATAT GCTATCCGAG G

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SEQ. ID. NO. 264

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1 MGNHNSKIA AICLIIFLVY KAWELLKWIW IKPKKLESCL RKQGLKGNSY GLFYGDMKEL
61 SKSLKEINSK PIINLSNEVA PRIIPYYLEI IQKYGKRCFV WQGPTPAILI TEPELIKEIF
121 GKNYVFQKPN NPNPLTKLLA RGVVSYEEK WAKHRKIINP AFHMEKLKHM LPAFYLSCE
181 MLNKWEEIIP VKESNELDIW PHLQRMTSDV ISRAAFGSSY EEGRRIFELQ EEQAEYLTKT
241 FNSVYIPGSR FFPNKMNMKRM KECEKEVRET ITCLIDNRLK AKEEGNGKAL NDDLGLILLE
301 SNSIEIEEHG NKKFGMSIPE VIEECKLFYF AGQETTSVLL VWTLLILGRN PEWQERAREE
361 VFQAFGSDKP TFDELYRLKI VTMIYLESIR LYPPIATRTR RTNEETKLGE LDLPKGALLF
421 IPTILLHLDR EIWGEDADEF NPERFSEGVA KATKGKMTYF PFGAGPRKCI GQNFALILEAK
481 MAIAMILQRF SFELSPSYTH SPYTVVTLKP KYGAPLIMHR L

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FIG. 133

NAME D233-AG7  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 265

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1 CTCATTATCC ATCACCTAAA ATGGAGAATT CTTGGGTTTT TCTAGCCTTG GCAGGGCTAT
61 CTGCATTAGC TTTTCTCTGT AAAATAATCA CCTGTCTGAAG ACCGGTTAAC CGGAAAATAC
121 CACCAGGTCC AAAACCATGG CCCATCATTG GCAATTTGAA CCTACTTGGT CCTATACCAC
181 ATCAATCTTT TGA CTGCTT TCCAAAAAAT ATGGAGAGTT GATGCTGCTG AAATTTGGCT
241 CCAGGCCAGT TCTTGTGCT TCATCTGCTG AAATGGCAAA ACAGTTTTTTA AAAGTACATG
301 ATGCTAATTT CGCCTCCCCT CCTATGCTAG CTGGTGGAAA GTATACAAGC TATAACTATT
361 GTGACATGAC ATGGGACCCC TATGGTCCCT ATTGGCGCCA AGCACGACGA ATTTACCTTA
421 ACCAGATATT TACTCCGAAA AGGCTAGACT CGTTCGAGTA CATTCGTGTT GAAGAAAGGC
481 AGGCCTTGAT TTCCCAGCTG AATTCCTTG CTGGAAAGCC ATTTTTTCTC AAAGACCATT
541 TGTCGCGATT TAGCCTCTGC AGCATGACAA GGATGGTTTT GAGCAACAAG TATTTTGGTG
601 AATCAACAGT TAGAGTAGAA GATTTGCACT ACCTGGTAGA TCAATGGTTC TTACTTAATG
661 GTGCTTTCAA CATTGGAGAT TGGATTCCAT GGCTCAGCTT CTTGGACCTA CAAGGCTATG
721 TGAAACAAAT GAAGGCTTTG AAAAGAACTT TTGATAAGTT CCACAACATT GTGCTAGATG
781 ATCACAGGGC TAAGAAGAAT GCAGAGAAGA ACTTTGTCCC AAAAGACATG GTTGATGTCT
841 TGTTGAAGAT GGCTGAAGAT CCTAATCTGG AAGTCAAAC CACTAATGAC TGTGTCAAAG
901 GGTAAATGCA GGATTTACTA ACTGGAGGAA CAGATAGCTT AACAGCAGCA GTGCAATGGG
961 CATTTCAAGA ACTTCTTAGA CAGCCAAGGG TTATTGAGAA GGCAACCGAA GAGCTTGACC
1021 GGATTGTCGG GAAAGAGAGA TGGGTAGAAG AGAAAGATTG CTCGCAGCTA TCTTACGTTG
1081 AAGCAATCCT CAAGGAAACA CTAAGGTTAC ATCCTCTAGG AACTATGCTA GCACCGCATT
1141 GTGCTATAGA AGATTGTAAC GTGGCTGGTT ATGACATACA GAAAGGAACG ACCTTTCTGG
1201 TGAATGTTTG GACCATTGGA AGGGACCCAA AATACTGGGA TAGAGCACAA GAGTTTCTCC
1261 CCGAGAGATT TTTAGAGAAC GACATTGATA TGGACGGACA TAACTTTGCT TTCTTGCCAT
1321 TTGGCTCGGG GCGAAGGAGG TGCCCTGGCT ATAGCCTTGG ACTTAAGGTT ATCCGAGTAA
1381 CATTAGCCAA CATGTTGCAT GGATTCAACT GGAAATTACC TGAAGGTATG AAGCCAGAAG
1441 ATATAAGTGT GGAAGAACAT TATGGGCTCA CTACACATCC TAAGTTTCCT GTTCCTGTGA
1501 TCTTGAATC TAGACTTTCT TCAGATCTCT ATTCCCCCAT CACTTAATCC TAAGTGCTTC
1561 CTATTATAGC

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SEQ. ID. NO. 266

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1 MENSWVFLAL AGLSALAFLC KIITCRRPVN RKIPPGPKPW PIIGNLNLG PIPHQSFDLL
61 SKKYGELMLL KFGSRPVLVA SSAEMAKQFL KVHDANFASR PMLAGGKYTS YNYCDMTWAP
121 YGPYWRQARR IYLNQIFTPK RLDSFEYIRV EERQALISQL NSLAGKPFFL KDHLRSRFLC
181 SMTRMVL SNK YFGESTVRVE DLQYLVDQWF LLNGAFNIGD WIPWLSFLDL QGYVKQMKAL
241 KRTFDKFHNI VLDDHRAKKN AEKNFVPKDM VDVLLKMAED PNLEVKL TND CVKGLMQDLL
301 TGGTDSLTA VQWAFQELLR QPRVIEKATE ELDRIVGKER WVEEKDCSQL SYVEAILKET
361 LRLHPLG TML APHCAIEDCN VAGYDIQKGT TFLVNVWTIG RDPKYWDRAQ EFLPERFLEN
421 DIDMDGHNFA FL PFGSGRRR CPGYSLGLKV IRVTLANMLH GFNWKLP EGM KPEDISVEEH
481 YGLTTHPKFP VPVILESRLS SDLYSPIT

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FIG. 134

NAME D257-AE4  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 267

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1 CACATTGAGT CCTCTCCCAA ATCACTGATT CACCACCAAA AGTACCAACA ATTCAATGGA
61 AGGTACAAAC TTGACTACAT ATGCAGCAGT ATTTCTTGAT ACTCTGTTTC TTTTGTTCCT
121 TTCCAAACTT CTTCGCCAGA GGAAACTCAA TTTACCTCCA GGCCCAAAAC CATGGCCGAT
181 CATCGGAAAC TTAAACCTTA TTGGCAATCT TCCTCATCGC TCAATCCACG AACTCTCCCT
241 CAAGTACGGA CCCGTTATGC AACTCCAATT CGGGTCTTTC CCCGTTGTAG TTGGATCCTC
301 CGTCGAAATG GCTAAGATTT TCCTCAAATC CATGGATATT AACTTTGTAG GCAGGCCTAA
361 AACGGCTGCC GGAAAATACA CAACGTACAA TTATTCCGAT ATTACATGGT CTCCTTACGG
421 ACCATATTGG CGCCAGGCAC GTAGGATGTG CCTAACGGAA TTATTCAGCA CGAAACGTCT
481 CGATTACATC GAGTATATTG GGGCTGAGGA GTTGCAATCT CTTCTCCATA ATTTGAACAA
541 AATATCAGGG AAACCAATTG TGTGAAAGA TTATTGACG ACGTTGAGTT TAAATGTTAT
601 TAGCAGGATG GTACTGGGGA AAAGGTATTT GGACGAATCC GAGAACTCGT TCGTGAATCC
661 TGAGGAATTT AAGAAGATGT TGGACGAATT GTTTTGTGTA AATGGTGTAC TTAATATTGG
721 AGATTCAATT CCATGGATTG ATTTTCATGGA TTTGCAAGGT TATGTTAAGA GGATGAAAGT
781 AGTGAGCAAG AAATTCGACA AGTTTTTAGA GCATGTTATT GATGAGCATA ACATTAGGAG
841 AAATGGAGTG GAGAATTATG TTGCTAAGGA TATGGTGGAT GTTTTGTTCG AGCTTGCTGA
901 TGATCCGAAG TTGGAAGTTA AGCTGGAGAG ACATGGAGTC AAAGCATTCA CTCAGGATAT
961 GCTGGCTGGT GGAACCGAGA GTTCAGCAGT GACAGTGGAG TGGGCAATTT CAGAGCTGCT
1021 AAAGAAGCCG GAGATTTTCA AAAAGGCTAC AGAAGAATTG GATCGAGTAA TTGGGCAGAA
1081 TAGATGGGTA CAAGAAAAGG ACATTCCAAA TCATCCTTAC ATAGAGGCAA TAGTCAAAGA
1141 GACTATGCCA CTGCACCCCG TGGCACC AAT GTTGGTGCCA CGTGAGTGTC GAGAAGATAT
1201 TAAGGTAGCA GGCTACGACG TTCAGAAAGG AACTAGGGTT CTCGTGAGTG TATGGACTAT
1261 TGGAAGAGAC CCTACATTGT GGGACGAGCC TGAGGTGTTT AAGCCGGAGA GATTCCATGA
1321 AAAGTCCATA GATGTTAAAG GACATGATTA TGAGCTTTTG CCATTTGGAG CGGGGAGAAG
1381 AATGTGCCCG GGTATAGCT TGGGGCTCAA GGTGATTCAA GCTAGCTTAG CTAATCTTCT
1441 ACATGGATTT AACTGGTCAT TGCCTGATAA TATGACTCCT GAGGACCTCA ACATGGATGA
1501 GATTTTGGG CTCTCTACAC CTAAAAAATT TCCACTTGCT ACTGTGATTG AGCCAAGACT
1561 TTCACCAAAA CTTTACTCTG TTTGATTCAG CAGTTCATAT GATCCGTCAA GATAGAC

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SEQ. ID. NO. 268

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1 MEGTNLTYYA AVFLDTLFLF FLSKLLRQRK LNLPPGPKPW PIIGNLNLIG NLPHRSIHEL
61 SLKYGPVMQL QFGSFPVVVG SSVEMAKIFL KSMDINFVGR PKTAAGKYTT YNYS DITWSP
121 YGPYWRQARR MCLTELFSTK RLDSY EYIRA EELHSL LHN L NKISGKPIVL KDYL T T LSLN
181 VISRMVLGKR YLDESENSFV NP EEFKMLD ELFLNGVLN IGDSIPWIDF MDLQGYVKRM
241 KVVSKKFDKF LEHVIDEHNI RRNGVENYVA KDMVDVLLQL ADDPKLEVKL ERHGVKFTQ
301 DMLAGGTESS AVTVEWAISE LLKKPEIFKK ATEELDRVIG QNRWVQEKDI PNHPYIEAIV
361 KETMRLHPVA PMLVPRECRE DIKVAGYDVQ KGTRVLVSVW TIGRDP TLWD EPEVFKPERF
421 HEKSIDVKGH DYELLFPFAG RRMCPGYSLG LKVIQASLAN LLHG FNWSLP DNMT PEDLNM
481 DEIFGLSTPK KFPLATVIEP RLSPKLYSV

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FIG. 135

NAME D268-AE2  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 269

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1 TGCAATATAG TTTTCCTAGT CAGTTCCTAGC CTCCTTTTCC TTAGAAATAA TGGATTATCA
61 TATTTCTTTC CATTTTCAAG CTCTTTTAGG GCTTTTAGCC TTTGTGTTCT TGTCTATTAT
121 CTTATGGAGA AGAACACTCA CTTCAAGAAA ATTAGCCCTT GAAATCCCAG GGGCATGGCC
181 TATTATAGGC CATCTTCGTC AGCTGAGTGG TACTGATAAG AATATCCCAT TTCCCCGAAT
241 ATTGGGCGCT TTGGCAGATA AATATGGACC TGTCTTCACA CTGAGAATAG GGATGTACCC
301 CTATTTGATT GTCAACAATT GGGGAAGCAGC TAAGGATTGT CTCACAACGC ATGATAAGGA
361 CTTCGCTGCC CGACCAACTT CTATGGCTGG TGAAAGCATC GGGTACAAGT ATGCGAGGTT
421 TACTTATGCT AATTTTGGTC CTTATTATAA CCAAGTGCGC AAACCTAGCCC TACAACATGT
481 ACTCTCGAGT ACTAAACTCG AGAAAATGAA ACACATACGT GTTTCTGAAT TGGAAACTAG
541 CATCAAAGAA TTATATTCTT TGACGCTGGG CAAAAACAAC ATGCAAAAAG TGAATATAAG
601 TAAATGGTTT GAACAATTGA CTTTAAACAT AATCGTGAAG ACAATTTGTG GCAAGAGATA
661 TAGCAACATA GAGGAGGATG AAGAGGCACA ACGTTTCAGA AAGGCATTTA AGGGCATCAT
721 GTTTGTTGTA GGGCAAATTG TTTTATATGA CGCAATTCCA TTCCCATTTG TCAAAACTTT
781 TGATTTCCAA GGTCAATATC AATTGATGAA CAAAATTTAT AAAGACTTAG ATTCTATTCT
841 TCAAGGATGG TTGGATGATC ATATGATGAA CAAGGATGTA AACAATAAGG ATCAAGATGC
901 CATAGATGCC ATGCTTAAGG TAACACAACCT TAATGAATTC AAAGCCTATG GTTTTCTCTCA
961 GGCCACTGTG ATCAAGTCGA CAGTCTTGAG TTTGATCTTA GATGGAAATG ACACAACCGC
1021 TGTTCAATTTG ATATGGGTAA TGTCTTATT ACTGAACAAT CCACATGTTA TGAAACAAGG
1081 CCAAGAAGAG ATAGACATGA AAGTGGGTAA AGAGAGGTGG ATTGAAGATA CTGACATAAA
1141 AAATTTAGTG TACCTTCAGG CTATCGTTAA AGAGACATTG CGCTTGATC CACCTGTTCC
1201 TTTTCTTTTA CCACACGAAG CAGTGCAAGA TTGTAAAGTG ACTGGTTACC ACATTCTTAA
1261 AGGTACTCGT CTATATATCA ATGCGTGAA AGTACATCGC GATTCTGAAA TTTGGTCAGA
1321 GCCCGAAAAG TTTATGCCCA ATAGATTCTT GACTAGCAA GCAAATATAG ATGCTCGCGG
1381 TCAAAATTTT GAATTTATAC CGTTTGGTTC TGGGAGACGG TCATGTCCAG GGTTAGGTTT
1441 TGCGACTTTA GTGACACATC TGACTTTTGG TCGCTTGCTT CAAGGTTTTG ATTTTAGTAA
1501 GCCATCAAAC ACGCCAATTG ACATGACAGA AGGCGTAGGC GTTACTTTGC CTAAGGTTAA
1561 TCAAGTTGAA GTTCTAATTA CCCCTCGTTT ACCTTCTAAG CTTTATTTAT TTTGAAAGTG
1621 CAAATCATCA ATCATGGGTT GAGTAATTAG TGATACT

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SEQ. ID. NO. 270

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1 MDYHISFHFQ ALLGLLAFVF LSIILWRRTL TSRKLAPEIP GAWPIIGHLR QLSGTDKNIP
61 FPRILGALAD KYGPVFTLRI GMPYLVNWN WEAAKDCLTT HDKDFAARPT SMAGESIGYK
121 YARFTYANFG PYYNQVRKLA LQHVLSSSTKL EKMKHIRVSE LETSIKELYS LTLGKNNMQK
181 VNISKWFEQL TLNIIIVKTIC GKRYSNIEED EEAQRFRKAF KGIMFVVGQI VLYDAIPFPL
241 FKYFDFQGHI QLMNKIYKDL DSILQGWLDD HMMNKDVNNK DQDAIDAMLK VTQLNEFKAY
301 GFSQATVIKS TVLSLILDGN DTTAVHLIWW MSLLLNNPHV MKQGQEEIDM KVGKERWIED
361 TDIKNLVYLQ AIVKETLRLY PPVPFLLPHE AVQDCKVTGY HIPKGTRLYI NAWKVHRDSE
421 IWSEPEKFMP NRFLTISKANI DARGQNFEFI PFGSGRRSCP GLGFATLVTH LTFGRLLQGF
481 DFSKPSNTPI DMTEGVGVTL PKVNQVEVLI TPRLP SKLYL F

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FIG. 136

NAME D283-AC1  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 271

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1 AGAGAGTGAA AATGGACGCA CTACTTCAAA TGACAGTAAC AGCATCTTGT GCTGCCATAG
61 TAATTACTCT GCTGGTGTGT ATATGGAGAG TGCTGAAGT GATTGGGTTT AGACCAAAGA
121 AATTGGAGTT GTTGTGAGA AAACAAGGTT TGGGAAGGAAA TTCTTACAAG GTTTTGTATG
181 GGGACATGAA AGAGTTTCTT GGGATGATTA AGGAAGCATA CTCAAAGCCT ATGAGTCTAT
241 CTGATGATGT AGCACCAGA CTGATGCCTT TCTTTCTTGA AACCATCAAA AAATATGGAA
301 AAAGATCCTT TATATGGTTT GGTCCAAGAC CACTAGTATT GATTATGGAT CCTGAGCTTA
361 TAAAGGAAGT ACTCTCAAAA ATCCATCTGT ATCAAAAGCC TGGTGGAAT CCATTAGCAA
421 CACTATTGGT ACAAGGAATA GCAACCTATG AGGAAGACAA ATGGGCCAAA CATAGAAAAA
481 TCATCAATCC CGCTTTCCAT CTAGAGAAGC TAAAGCTTAT GCTTCCAGCA TTTCGCTTAA
541 GCTGTAGTGA GATGCTGAGC AAATGGGAAG ACATTGTTTC AGCTGATAGC TCACATGAGA
601 TAGATGTATG GTCTCACCTT GAGCAATTGA CTTGCGATGT GATCTCTCGG ACAGCTTTTG
661 GCAGTAGTTA TGAAGAAGGT AGAAAGATTT TTGAACTTCA AAAGGAACAA GCTCAGTATC
721 TTGTGGAAGT TTTCCGCTCC GTTTATATCC CAGGAAGGAG ATTTTGGCCA ACAAAGAGGA
781 ATAGAAGAAT GAAGGAAATA AAAAAGGATG TCCGGGCATC AATTAAAGGT ATTATTGATA
841 AAAGATTGAA GGCAATGAAA GCAGGGGACA CCAATAATGA GGATCTATTG GGTATATTAC
901 TGGAATCGaA TATTAAAGAA ATTGAACAGC ACGGAAACAA GGATTTTGGG ATGAGCATTG
961 AAGAAGTCAT TGAAGAATGC AAGTTATTCT ATTTTGCTGG CCAAGAACT ACATCAGTGT
1021 TACTCCTATG GTCTCTAGTG TTGTTGAGCA GGTATCAAGA TTGGCAGGCA CGGGCCAGAG
1081 AAGAAATCTT GCAAGTCTTT GGCAGTCGAA AACCAGATTT TGACGGATTA AATCATCTAA
1141 AAATTGTGAC AATGATCTTG TACGAGTCTT TAAGGCTGTA TCCCTCACTA ATAACACTTA
1201 CCCGCCGGTG TAATGAAGAC ATTGTATTAG GAGAACTATC TCTACCAGCT GGTGTTCTAG
1261 TCTCTTTGCC ATTGATTTTG TTGCATCATG ATGAAGAGAT ATGGGGTGAA GATGCAAAGG
1321 AGTTCAAACC AGAGAGATTT AGAGAAGGAA TATCAAGTGC AACAAAGGGT CAACTCACAT
1381 ATTTTCCATT TAGCTGGGGT CCTAGAATAT GTATTGGACA AAATTTTGCC ATGTTAGAAG
1441 CAAAGATGGC TCTGTCTATG ATCCTGCAAC GCTTCTCTTT TGAAGTGTCT CCGTCTTATG
1501 CACATGCCCC TCGGTCCATA ATAACCGTTC AGCCTCAGTA TGGTGCTCCA CTTATTTTCC
1561 ACAAACATA ATTTTGGTAC TTCTACTAAT ATTTTAGGGT TTATTCAGAC TCAAAAAAAA

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SEQ. ID. NO. 272

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1 MVTIASCAAI VITLLVCIWR VLNWIWFRPK KLELLLRKQG LEGNSYKVLY GDMKEFSGMI
61 KEAYSKPMSL SDDVAPRLMP FFLETIKKYG KRSFIWFGPR PLVLIMDPOL I KEVLSKIHL
121 YQKPGGNPLA TLLVQGIATY EEDKWAKHRK IINPAFHLEK LKLMLPAFRL SCSEMLSKWE
181 DIVSADSSHE IDVWSHLEQL TCDVISRTAF GSSYEGRKI FELQKEQAQY LVEVFRSVYI
241 PGRRFLPTKR NRRMKIKKD VRASIKGIID KRLKAMKAGD TNNE DLLGIL LESNIKEIEQ
301 HGKDFGMSI EEVIEECKLF YFAGQETTSV LLLWSLVLLS RYQDWQARAR EEILQVFGSR
361 KPFDGDLNHL KIVTMILYES LRLYPSLITL TRRCNEDIVL GELSPLAGVL VSLPLILLHH
421 DEEIWGEDAK EFKPERFREG ISSATKGQLT YFPFSWGPRI CIGQNFAMLE AKMALSMILQ
481 RFSFELSPSY AHAPRSIITV QPQYGAPLIF HKL

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FIG. 137

NAME D244-AB6  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 273

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1 TGCAATATAG TTTTCCTAGT CAGTTCCTAGC CTCCTTTTCC TTAGAAATAA TGGATTATCA
61 TATTTCTTTC CATTTTCAAG CTCTTTTAGG GCTTTTAGCC TTTGTGTCT TGTCTATTAT
121 CTTATGGAGA AGAACACTCA CTTCAAGAAA ATTAGCCCCT GAAATCCCAG GGGCATGGCC
181 TATTATAGGC CATCTTCGTC AGCTGAGTGG TACTGATAAG AATATCCCAT TTCCCCGAAT
241 ATTGGGCGCT TTGGCAGATA AATATGGACC TGTCTTCACA CTGAGAATAG GGATGTACCC
301 CTATTTGATT GTCAACAATT GGAAGCAGC TAAGGATTGT CTCACAACGC ATGATAAGGA
361 CTTggCTGCC CGACCAACTT CTATGGCTGG TGAAAGCATC GGGTACAAGT ATGCGAGGTT
421 TACTTATGCT AATTTTGGTC CTTATTATAA CCAAGTGCGC AAAGTAGCCC TACAACATGT
481 ACTCTCGAGT ACTAACTCG AGAAAATGAA ACACATACGT GTTCTGAAT TGGAAACTAG
541 CATCAAAGAA TTATATTCTT TGACGCTGGG CAAAACAAC ATGCAAAAAG TGAATATAAG
601 TAAATGGTTT GAACAATTGA CTTTAAACAT AATCGTGAAG ACAATTTGTG GCAAGAGATA
661 TAGCAACATA GAGGAGGATG AAGAGGCACA ACGTTTCAGA AAGGCATTTA AGGGCATCAT
721 GTTTGTTGTA GGGCAAATTG TTTTATATGA CGCAATTCCA TTCCCATTTGT TCAAATACTT
781 TGATTTCCAA GGTCATATAC AATTGATGAA CAAAATTTAT AAAGACTTAG ATTCTATTCT
841 TCAAGGATGG TTGGATGATC ATATGATGAA CAAGGATGTA AACAATAAGG ATCAAGATGC
901 CATAGATGCC ATGCTTAAGG TAACACAAC TAATGAATTC AAAGCCTATG GTTTTTCTCA
961 GGCCACTGTG ATCAAGTCGA CAGTCTTGAG TTTGATCTTA GATGGAAATG ACACAACCGC
1021 TGTTCATTTG ATATGGGTAA TGTCCTTATT ACTGAACAAT CCACATGTTA TGAAACAAGG
1081 CCAAGAAGAG ATAGACATGA AAGTGGGTAA AGAGAGGTGG ATTGAAGATA CTGACATAAA
1141 AAATTTAGTG TACCTTCAGG CTATCGTTAA AGAGACATTG CGCTTGTATC CACCTGTTCC
1201 TTTTCTTTTA CCACACGAAG CAGTGCAAGA TTGTAAAGTG ACTGGTTACC ACATTCTTAA
1261 AGGTACTCGT CTATATATCA ATGCGTGGAA AGTACATCGC GATCCTGAAA TTTGGTCAGA
1321 GCCCCGAAAAG TTTATGCCCA ATAGATTCTT GACTAGCAAA GCAAATATAG ATGCTCGCGG
1381 TCAAATTTT GAATTTATAC CGTTTGGTTC TGGGAGACGG TCATGTCCAG GGATAGGTTT
1441 TGCGACTTTA GTGACACATC TGACTTTTGG TCGCTTGCTT CAAGGTTTTG ATTTTAGTAA
1501 GCCATCAAAC ACGCCAATTG ACATGACAGA AGGCGTAGGC GTTACTTTGC CTAAGGTTAA
1561 TCAAGTTGAA GTTCTAATTA CCCCTCGTTT ACCTTCTAAG CTTTATTTAT TTTGAAGGTG
1621 CAAATCATCA ATCATGGCTT GAGTAATTAG TTATACTTTA ATATGTTTCT C

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SEQ. ID. NO. 274

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1 MDYHISFHFQ ALLGLLAFVF LSIILWRRTL TSRKLAPEIP GAWPIIGHLR QLSGTDKNIP
61 FPRILGALAD KYGPVFTLRI GMPYLVIVNN WEAAKDCLTT HDKDLAARPT SMAGESIGYK
121 YARFTYANFG PYYNQVRKLA LQHVLSSTKL EKMKHIVSE LETSIKELYS LTLGKNMOK
181 VNISKWFEQL TLNIIVKTIC GKRYSNIEED EEAQRFKAF KGIMFVVGQI VLYDAIPFPL
241 FKYFDFQGHI QLMNKIYKDL DSILQGWLDD HMMNKDVNNK DQDAIDAMLK VTQLNEFKAY
301 GFSQATVIKS TVLSLILDGN DTTAVHLIIV MSLLLNNPHV MKQGQEEIDM KVGKERWIED
361 TDIKNLVYLQ AIVKETLRLY PPVPFLLPHE AVQDCKVTGY HIPKGTRLYI NAWKVHRDPE
421 IWSEPEKEMP NRFLTSKANI DARGQNFEEI PFGSGRRSCP GIGFATLVTH LTFGRLLQGF
481 DFSKPSNTPI DMTEGVGVTL PKVNQVEVLI TPRLP SKLYL F

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FIG. 138

NAME D205-BE9  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 275

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1 TTTGATTCAA CCATGGAGAA CCAATACTCC TACTCATTCT CTCCTACTT CTACTTAGCT
61 ATAGTACTGT TTCTTCTTCC AATTTTGGTC AAATATTTCT TCCATCGGAG AAGAAATTTA
121 CCTCCAAGTC CATTTTCTCT TCCAATAATT GGTACACCTT ACCTTCTCAA GAAAACTCTC
181 CATCTCACTC TAACATCCTT ATCAGCTAAA TATGGTCCTG TTTTATACCT CAAATTTGGGC
241 TCTATGCCTG TGATTGTTGT GTCCTCACCA TCTGCTGTTG AAGAATGTTT AACCAAGAAT
301 GATATCATAT TCGCAAATAG GCCCAAGACC GTGGCTGGTG ACAAGTTTAC CTACAATTAT
361 ACTGTTTATG TTTGGGCACC CTATGGCCAA CTTTGGAGAA TTCTTCGCCG ATTAAGTGTG
421 GTTGAAGTCT TCTCTTCACA TAGCCTACAG AAAACTTCTA TCCTTAGAGA TCAAGAAGTT
481 GCAATATTTA TCCGTTTCGT ATACAAATTC TCAAAGGATA GTAGCAAAA AGTCGATTTG
541 ACCAACTGGT CTTTTACTTT GGTTTTCAAT CTTATGACCA AAATTATTGC TGGGAGACAT
601 ATTGTGAAGG AGGAAGATGC TGGCAAGGAA AAGGGCATTG AAATTATTGA AAAACTTAGA
661 GGGACTTTCT TAGTAACTAC ATCATTCTTG AATATGTGTG ATTTCTTGCC AGTATTCAGG
721 TGGGTTGGTT ACAAAGGGCA GGAGAAGAAG ATGGCCTCAA TTCACAATAG AAGAAATGAA
781 TTCTTGAACA GCTTGCTTGA TGAATTTTCA CACAAGAAAA GTAGTGCTTC ACAATCTAAC
841 ACAACTGTTG GAAACATGGA GAAGAAAACC AACTGATGTA AAAAGCTCTT GTCTCTTCAA
901 GAATCAGAGC CTGAATTCTA CACTGATGAT ATCATCAAAA GTATTATGCT GGTAGTTTTT
961 GTTGCAGGAA CAGAGACCTC ATCAACAACC ATCCAATGGG TAATGAGGCT TCTTGTAGCT
1021 CACCCTGAGG CATTGTATAA GCTACGAGCT GACATTGACA GTAAAGTTGG GAATAAGCGC
1081 TTGCTGAATG AATCAGACCT CAACAAGCTT CCGTATTTGC ATTGTGTTGT TAATGAGACA
1141 ATGAGATTAT AACTCCGAT ACCACTTTTA TTGCCTCATT ATTCAACTAA AGATTGTATT
1201 GTGGAAGGAT ATGATGTACC AAAACATACA ATGTTGTTTG TCAACGCTTG GGCCATTAC
1261 AGGGATCCCA AGGTATGGGA GGAGCCTGAC AAGTTCAAGC CAGAGAGATT TGAGGCAACA
1321 GAAGGGGAAA CAGAAAGGTT CAATTACAAG CTTGTACCAT TTGGAATGGG GAGAAGAGCG
1381 TGCCCTGGAG CTGATATGGG GTTGCGAGCA GTTTCTTTGG CATTAGGTGC ACTTATTCAA
1441 TGCTTTGACT GGCAAATTGA GGAAGCGGAA AGCTTGGAGG AAAGCTATAA TTCTAGAATG
1501 ACTATGCAGA ACAAGCCTTT GAAGGTTGTC TGCACTCCAC GCGAAGATCT TGGCCAGCTT
1561 CTATCCAAC TCTAAGGCAA TTTATCAATG CCAAACGTAA TCTTCATCTA CCACTATG

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SEQ. ID. NO. 276

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1 MENQYSYSFS SYFYLAIVLF LLPILVKYFF HRRRNLPSP FSLPIIGHLY LLKKTILHLTL
61 TSLSAKYGPV LYLKLGMPV IVVSSPSAVE ECLTKNDIIF ANRPKTVAGD KFTYNYTVYV
121 WAPYGQLWRI LRRLTVVELF SSHSLQKTSI LRDQEVAFI RSLYKFSKDS SKKVDLTNWS
181 FTLVFNLMTK IIAGRHIKVE EDAGKEKGIE IIEKLRGTFL VTTSFLNMCD FLPVFRWVG
241 KGQEKMASI HNRNEFLNS LLDEFHKKKS SASQSNTTVG NMEKKTTLIE KLLSLQES
301 EFTYDDIIS IMLVVFVAGT ETSSTTIQWV MRLLVAHPEA LYKLRADIDS KVGKRLN
361 SDLNKLPHY CVVNETMRLY TPIPLLLPHY STKDCIVEGY DVPKHTMLFV NAWAIHRDPK
421 VWEEDKFKP ERFEATEGET ERFNYKLVFP GMGRRACPGA DMGLRAVSLA LGALIQC
481 QIEEAESLEE SYNSRMTMQN KPLKVVCTPR EDLGQLLSQL

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FIG. 139

NAME D136-AF4  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 277

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1 CCTTTTAAAG ATGTATTTAA GATTTAAGAT TTAAGATGAA GCAACTGAGG TAAGTCCTTT
61 CAAGGAGTAG TTGTCACTTC TGAGAATGGA GATGATGTAC AGCATAATAG CAGCAGCCAG
121 TATTGCAATT ATCTTGGTAT ATACATGGAA AGTGTTGAAT TGGGCTTGGT TTGGGCCGAA
181 GAAAATGGAG AAATGCTTAA GACAGAGGGG TCTCAAGGGA AATCCTTATA AGCTACTCTA
241 TGGAGATCTA AACGAACTGA CAAAAAGCAT AATAGAAGCC AAGTCTAAGC CCATCAATTT
301 CTCTGATGAT ATTGCTCAAA GGCTCATCCC TTTTTTTCTT GACGCCATCA ACAAAAATGG
361 TAAAAACTCC TTCGTCTGGC TTGGACCGTA TCCAATAGTG TTGATCACGG ATCCTGAGCA
421 TTAAAGGAG ATTTTCACAA AGAATTATGT GTATCAAAAG CAAACTCATC CCAATCCATA
481 CGCCAAGCTA TTAGCTCACG GTCTTGTCAG CCTTGAGGAA GACAAATGGG CCAAACACAG
541 AAAAATCATT AGTCCTGCCT TCCATGTCGA GAAGCTAAAG GTTCCAAAAG AAACATCATT
601 TCTGAGTTGT AGTGAAATGA TAAGCAAATG GGAGGAGGTT CATATGCTGC CTGCATTTTA
661 CGAGCTCGAT GTATGGCCAG ACCTTCAAAT AATGACCAGT GAAGTCATTT CTCGCACTGC
721 ATTTGGGAGT AGCTATGAAG AAGGAAGAAT AGTATTTGAA CTTCAAGAAAG AACAAGCTGA
781 GTATGTAATG GACATAGGAC GTTCAATTTA TATACCAGGA TCAAGGTTCT TGCCTACTAA
841 AAGGAACAAA AGAATGCTGG AAATTGAAAA GCAAGTGCAA ACAACAATTA GGCCTATCAT
901 GCACAAAAGA TTGAAGGCAA TGGAAGAAGG GGAGACTAGT AAAGATGACT TATTAGGCAT
961 ATTACTTGAA TCCAATTTGA AAGAAATTGA ACTTCATGGA AGAAATGACT TGGGAATAAC
1021 AACGTCAGAA GTGATTGAAG AGTGCAAGTT ATTCTATTTT GCCGGCCAAAG AGACCACTTC
1081 AGTGTTGCTT GTTTGGACAA TGATTTTGTG GTGCTTACAT CCAGAGTGGC AAGTACGTGC
1141 CAGAAAGGAA GTGTTGCAGA TCTTTGGAAA TGATAAACCA GATTTGGAAG GACTAAGTCG
1201 CTTGAAAATT GTAACAATGA TCTTGTACGA GACGTTACGC CTATTCCCCC CATTACCAGC
1261 ATTTGGTAGA AGGAACAAAG AAGAAGTCAA ATTAGGGGAG CTACATCTAC CGGCTGGAGT
1321 GTTACTCGTT ATACCAGCAA TCTTAGTACA TTATGATAAG GAAATATGGG GTGAAGATGC
1381 AAAGGAATTC AAACCAGAAA GATTCAAGTA AGGAGTGTC AAGGCAACAA ATGGACAAGT
1441 CTCATTTATA CCATTTAGCT GGGGACCTCG TGTTTGCAAT GGACAAAAC TCGCAATGAT
1501 GGAAGCAAAA ATGGCAGTAA CTATGATACT ACAAAAATTC TCCTTTGAAC TATCCCCTTC
1561 TTATACACAT GCTCCATTTG CAATTGTGAC TATTCATCCC CAGTATGGTG CTCCTCTGCT
1621 TATGCGCAGA CTTTAAACA TATGTTGCTG ATATTTAAGA TCAGTGGCGT TTTATT

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SEQ. ID. NO. 278

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1 MEMMYSIIAA ASIAIILVYT WKVLNWAUFG PKKMEKCLRQ RGLKGNPYKL LYGDLNELTK
61 SIIEAKSKPI NFSDDIAQRL IPFFLDIAINK NGKNSFVWLG PYPIVLITDP EHLKEIFTKN
121 VVYQKQTHPN PYAKLLAHGL VSLEEDKWAK HRKIISPAPH VEKLKHLPA FYLSCSEMIS
181 KWEEVVPKET SFELDVWPD LQIMTSEVISR TAFGSSYE EG RIVFELQKEQ AEYVMDIGRS
241 IYIPGSRFLP TKRNKRMLEI EKQVQTTIRR IIDKRLKAME EG EGETSKDDL GILLESNLKE
301 IELHGRNDLG ITTSEVIEEC KLFYFAGQET TSVLLVWTMI LLCLHPEWQV RARKEVLQIF
361 GNDKPDLEGL SRLKIVTMIL YETLRLFPPL PAFGRRNKEE VKLGELHLP GVLVLPAIL
421 VHYDKIEWGE DAKEFKPERF SEGVSKATNG QVSFIPFSWG PRVCIGQNEA MMEAKMAVMT
481 ILQKFSFELS PSYTHAPFAI VTIHPQYGAP LLMRRL

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FIG. 140

NAME D101-BA2  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 279

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1 CTAAATTTCA TATACCTTTA GTACTCTTGA AATTTTCAAA TAATGGTTTA TCTTCTTTCT
61 CCCATAGAAG CCATTGTAGG ATTTGTAACC TTTTCATTC TATTCTACTT TCTATGGACC
121 AAAAAACAAT CAAAAATCTT AAACCCACTA CCTCCAAAAA TCCCAGGTGG ATGGCCAGTA
181 ATCGGCCATC TCTTTTATTT CAAGAACAAT GGCGATGAAG ATCGCCATTT TTCTCAAAAA
241 CTCGGTGACT TAGCTGACAA ATATGGTCCC GTCTTCACTT TCCGGTTAGG GTTTCGCCGT
301 TTCTTGGCGG TGAGTAGTTA TGAAGCTATG AAAGAATGCT TCACTACCAA TGATATCCAT
361 TTCGCCGATC GGCCATCTTT ACTCTACGGA GAATACCTTT GCTATAATAA TGCCATGCTT
421 GCTGTTGCCA AATATGGCCC TTACTGGAAA AAAAATCGAA AGTTAGTCAA TCAAGAA GTT
481 CTCTCCGTTA GTCGGCTCGA AAAATTCAAA CATGTTAGAT TTTCTATAAT TCAGAAAAAT
541 ATTAAACAAT TGTATAATTG TGATTCACCA ATGGTGAAGA TAAACCTTAG TGATTGGATA
601 GATAAATTGA CATTCGACAT CATTTTGAAA ATGGTTGTTG GGAAGAACTA TAATAATGGA
661 CATGGAGAAA TACTCAAAGT TGCTTTTCAG AAATTCATGG TTCAAGCTAT GGAGATGGAG
721 CTCTATGATG TTTTTCACAT TCCATTTTTC AAGTGGTTGG ATCTTACAGG GAATATTAAG
781 GCTATGAAAC AAACTTTCAA AGACATTGAT AATATTATCC AAGGTTGGTT AGATGAGCAC
841 ATTAAGAAGA GAGAAACAAA GGATGTTGGA GGTGAAAACG AACAAGATTT TATAGATGTG
901 GTGCTTTCCA AGATGAGCGA CGAACATCTT GGCGAGGGTT ACTCTCATGA CACAACCATC
961 AAAGCAACTG TATTCACTTT GGTCTTGGAT GCAACAGACA CACTTGCACT TCATATAAAG
1021 TGGGTAATGG CGTTAATGAT AAACAATAAG CATGTCATGA AGAAGACACA AGAAGAGATG
1081 GACACAATTG TTGGTAGAGA TAGATGGGTA GAAGAGAGTG ATATCAAGAA TTTGGTGTAT
1141 CTCCAAGCAA TTGTTAAAGA AGTATTACGA TTACATCCAC CTGCACCTTT GTCAGTGCAA
1201 CACCTATCTG TGAAGATTG TGTTGTCAAT GGGTACCATA TTCCTAAGGG GACTGCACTA
1261 CTTACCAATA TTATGAAACT ACAGCGAGAT CCTCAAACAT GGCCAAATCC TGATAAATTC
1321 GATCCAGAGA GATTCTGAC GACTCATGCT ACTATTGACT ACCGCGGGCA GCACTATGAG
1381 TTGATCCCCT TTGGTACGGG GAGACGAGCT TGTCCCGCGA TGAATTATTC ATTGCAAGTG
1441 GAACACCTTT CAATTGCTCA TATGATCCAA GGTTCAGTT TTGCAACTAC GACCAATGAG
1501 CCTTTGGATA TGAAACAAGG TGTGGGTTTA ACTTTACCAA AGAAGACTGA TGTGAAGTT
1561 CTAATTACCC CTCGTTT

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SEQ. ID. NO. 280

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1 MVYLLSPIEA IVGFVTFSL FYFLWTKKQS KILNPLPPKI PGGWPVIGHL FYFKNNGDED
61 RHFSQKLGLD ADKYGPVFTF RLGFRRFLAV SSYEAMKECF TTNDIHFADR PSLLYGEYLC
121 YNNAMLAVAK YGPYWKKNRK LVNQEVLSVS RLEKFKHVRF SIIQKNIKQL YNCDSPMVKI
181 NLSDWIDKLT FDIILKMVVG KNYNNGHGEI LKVAFAQFMV QAMEMELYDV FHIPFFKWLD
241 LTGNIKAMKQ TFKDIDNIIQ GWLDEHIKKR ETKDVGGENE QDFIDVVL SK MSDEHLGEGY
301 SHDTTIKATV FTLVLDATDT LALHIKWVMA LMINNKHVMK KAQEEMDTIV GRDRWVEESD
361 IKNLVYLQAI VKEVLRLHPP APLSVQHLSV EDCVVNGYHI PKGTALLTNI MKLQRDPQW
421 PNPDKFDPER FLTTHATIDY RGQHYELIPF GTGRRACPAM NYSLOVEHLS IAHMIQGFSE
481 ATTTNEPLDM KQGVGLTLPK KTDVEVLITP R

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FIG. 141

NAME D130-AA1  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 281

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1 CTTTTTCTCC CCAAAAAAGA GCTCATTTCC CTTGTCCCCA AAAATGGATC TTCTCTTACT
61 AGAGAAGACC TTAATTGGTC TCTTCTTTGC CATTTTAATC GCTGTAATTG TCTCTAGACT
121 TCGTTCAAAG CGTTTTAAGC TTCCCCCAGG ACCAATCCCA GTACCAGTTT TTGGTAATTG
181 GCTTCAAGTT GGTGATGATT TAAACCACAG AAATCTTACT GATTTTGCCA AAAAATTTGG
241 TGATCTTTTC TTGTTAAGAA TGGGCCAGCG TAATTTAGTT GTTGTGTCAT CTCCTGAATT
301 AGCTAAAGAA GTTTTACACA CACAAGGTGT TGAATTTGGT TCAAGAACAA GAAATGTTGT
361 ATTTGATATT TTTACTGGAA AAGGTCAAGA TATGGTTTTT ACTGTATATG GTGAACACTG
421 GAGAAAAATG AGGAGAATTA TGACTGTACC ATTTTTTACT AATAAAGTTG TGCAGCAATA
481 TAGAGGGGGG TGGGAGTTTG AAGTGGCAAG TGTAATTGAG GATGTGAAGA AAAATCCTGA
541 ATCTGCTACT AATGGGATTG TATNAAGGAG GAGATTACAA TTGATGATGT ATAATAATAT
601 GTTTAGGATT ATGTTTGATA GGAGATTGGA GAGTGAAGAT GATCCTTTGT TTGTTAAGCT
661 TAAGGCTTTG AATGGTGAAA GGAGTAGATT GGCTCAGAGT TTTGAGTATA ATTATGGTGA
721 TTTTATTCCC ATTTTGAGGC CTTTTTTGAG AGGTTATTTG AAGATCTGTA AAGAAGTTAA
781 GGAGAAGAGG CTGCAGCTTT TCAAAGATTA CTTTGTTGAT GAAAGAAAGA AGCTTTCAAA
841 TACCAAGAGC TTGGACAGCA ATGCTCTGAA ATGTGCGATT GATCACATTC TTGAGGCTCA
901 ACAGAAGGGG GAGATCAATG AGGACAACGT TCTTTACATT GTTGAAAACA TCAATGTTGC
961 TGCTATAGAA ACCACATTAT GGTCAATTGA GTGGGGTATC GCCGAGTTAG TCAACCACCC
1021 TCACATCCAA AAGAAACTCC GCGACGAGAT TGACACAGTT CTTGGCCCAG GAGTGCAAGT
1081 GACTGAACCA GACACCCACA AGCTTCCATA CCTTCAGGCT GTGATCAAGG AGACGCTTCG
1141 TCTCCGTATG GCAATTCCTC TATTAGTCCC ACACATGAAC CTTCACGATG CAAAGCTTGG
1201 CGGGTTTGAT ATTCCAGCAG AGAGCAAAAT CTTGGTTAAC GCTTGGTGGC TAGCTAACAA
1261 CCCGGCTCAT TGGAAGAAAC CCGAAGAGTT CAGACCCGAG AGGTTCCTTCG AAGAGGAGAA
1321 GCACGTTGAG GCCAATGGCA ATGACTTCAG ATATCTTCCG TTTGGCGTTG GTAGGAGGAG
1381 TTGCCCTGGA ACTATACTTG CATTGCCAAT TCTTGGCATT ACTTTGGGAC GTTT

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SEQ. ID. NO. 282

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1 MDLLLLLEKTL IGLFFAILIA VIVSRLRSKR FKLPPGPIPV PVFGNWLQVG DDLNHRNLTD
61 FAKKFGDLFL LRMGQRNLVV VSSPELAKEV LHTQGVEFGS RTRNVVFDIF TGKGQDMVET
121 VYGEHWRKMR RIMTVPFFTN KVVQQYRGGW EFEVASVIED VKKNPESATN GIVLRRRLQL
181 MMYNNMFRIM FDRRFESDD PLFVKLKALN GERSRLAQSF EYNYGDFIPI LRPFLRGYLLK
241 ICKEVKEKRL QLFKDYFVDE RKKLSNTHSL DSNALKCAID HILEAQKGE INEDNVLYIV
301 ENINVAAIET TLWSIEWGIA ELVNHPIQK KLRDEIDTVL GPGVQVTEPD THKLPLYLQAV
361 IKETLRLRMA IPLLVPHMNL HDAKLGGFID PAESKILVNA WWLANNPAHW KKPEEFRPER
421 FFEEEKHVEA NGNDFRYLPF GVGRRSRCPGT ILALPILGIT LGR

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FIG. 142

NAME D136-AD5  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 283

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1 CCAAATTAGA GCAAGAAATT AACAAAGTCTA GTTACCTTCT CCCTTTTTTAA GAGTATTTAA
61 GATTTAAGAT TTAAGATGAA GCAACTGAGG TAAGTCCTTT CAAGGAGTAG TTGTCACTTC
121 TGAGAATGGA GATGATGTAC AGCATAATAG CAGCAGCCAG TATTGCAATT ATCTTGGTAT
181 ATACATGGAA AGTGTTGAAT TGGGCTTGGT TTGGGCCAAA GAAAATGGAG AAATGCTTAA
241 GACAGAGGGG TCTCAAGGGA AATCCTTATA AGCTACTCTA TGGAGATCTA AACGAACTGA
301 CAAAAAGCAT AATAGAAGCC AAGTCTAAGC CCATCAATTT CTCTGATGAT ATTGCTCAAA
361 GGCTCATCCC TTTTTTCTT GACGCCATCA ACAAAAATGG TAAAACTCC TTCGTCTGGC
421 TTGGACCGTA TCCAATAGTG TTGATCACGG ATCCTGAGCA TTTAAAGGAG ATTTTCACAA
481 AGAATTATGT GTATCAAAAG CAAACTCATC CCAATCCATA CGCCAAGCTA TTAGCTCACG
541 GTCTTGTCTAG CCTTGAGGAA GACAAATGGG CCAACACAG AAAAATCATT AGTCCTGCCT
601 TCCATGTCGA GAAGCTAAAG CATATGCTGC CTGCATTTTA TCTGAGTTGT AGTGAAATGA
661 TAAGCAAATG GGAGGAGGTT GTTCCAAAAG AAACATCATT CGAGCTCGAT GTATGGCCAG
721 ACCTTCAAAT AATGACCAGT GAAGTCATTT CTCGCACTGC ATTTGGGAGT AGCTATGAAG
781 AAGGAAGAAT AGTATTTGAA CTTCAAGAAAG AACAAAGCTGA GTATGTAATG GACATAGGAC
841 GTTCAATTTA TATACCAGGA TCAAGGTTCT TGCCTACTAA AAGGAACAAA AGAATGCTGG
901 AAATTGAAAA GCAAGTGCAA ACAACAATTA GGCCTATCAT CGACAAAAGA TTGAAGGCAA
961 TGGAGAAGG GGAGACTAGT AAAGATGACT TATTAGGCAT ATTACTTGAA TCCAATTTGA
1021 AAGAAATTGA ACTTCATGGA AGAAATGACT TGGGAATAAC AACATCAGAA GTGATTGAAG
1081 AGTGCAAGTT AATCTATTTT GCCGGCCAAG AGACCACTTC AGTGTTGCTT GTTTGGACAA
1141 TGATTTTGTG GTGCTTACAT CCAGAGTGGC AAGTACGTGC CAGAAAGGAA GTGTTGCAGA
1201 CCTTTGGAAG TGATAAACCA GATTTGGAAG GACTAAGTCG CTTGAAAATT GTAACAATGA
1261 TCTTGTACGA GACGTTACGC CTATTCCTCC CATTACCAGC ATTTGGTAGA AGGAACAAAG
1321 AAGAAGTCAA ATTAGGGGAG CTACATCTAC CGGCTGGAGT GTTACTCGTT ATACCAGCAA
1381 TCTTAGTACA TTATGATAAG GAAATATGGG GTGAAGATGC AAAGGAATTC AAACCAGAAA
1441 GATTCAGTGA AGGAGTGTCA AAGGCAACAA ATGGACAAGT CTCATTTATA CCATTTAGCT
1501 AGGGACCTCG TGTTTGCAAT GGACAAAAC TCGCAATGAT GGAAGCAAAA ATGGCAGTAA
1561 CTATGATACT ACAAAAATTC TCCTTTGAAC TATCCCCTTC TTATACACAT GCTCCATTTG
1621 CAATTGTGAC TATTCATCCC CAGTATGGTG CTCCTCTGCT TATGCGCAGA CTTTAAACA
1681 TATGTTGCTG ATATTTAAGA TCAGTGGCGT TTTATTCTCC ATG

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SEQ. ID. NO. 284

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1 MEMMYIIIAA ASIAIILVYT WKVLNWAFFG PKKMEKCLRQ RGLKGNPYKL LYGDLNELTK
61 SIIEAKSKPI NFSDDIAQRL IPFFLDANK NGKNSFVWLG PYPIVLITDP EHLKEIFTKN
121 VVYQKQTHPN PYAKLLAHGL VSLEEDKWAK HRKIISPAFH VEKLKHLPA FYLSCSEMIS
181 KWEEVVPKET SFELDVWPD LQIMTSEVISR TAFGSSYE EGTSKDDL GILLESNLKE
241 IYIPGSRFLP TKRNKRMLEI EKQVQTTIRR IIDKRLKAME EGETSKDDL GILLESNLKE
301 IELHGRNDLG ITTSEVIEEC KLIYFAGQET TSVLLVWTMI LLCLHPEWQV RARKEVLQTF
361 GNDKPDLEGL SRLKIVTMIL YETLRLFPPL PAFGRNKEE VKLGELHLPA GVLLVIPAIL
421 VHYDKEIWGE DAKEFKPERF SEGVSKATNG QVSFIPFS

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FIG. 143

NAME D138-AD12  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 285

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1 TTTGCCTTTG CTCGTCATTG ATGACGACTT CATTTTGT TT TCTTCCCCAC GAAAATGGTA
61 GATATGATAT GGAGGGACGT AGGGAAGAAT TACTGGGACA AACCTAGTGA GTGAAAATGG
121 AAACAGTTGA AATGATAGTA AAAGTATCTT GTGCTGCCAT AGTAATTACT CTGTTGGTGT
181 GTCTATGGAG AGTGCTGAAT TGGGTTTGGT TCAGACCAAA GAAATTAGAG AAGTTGTTGA
241 GAAAACAGGT TTTGTATGGG GACATGAAAG AGTTTTCTGG GATGATTAAG GAAGCATACT
301 CAAAGCCTAT GAGTCTGTCT GATGATGTAG CACCACGAAT GATGCCTTTC TTTCTTGAAA
361 CCATCAAGAA ATATGGAAAA AGATCCTTTA TATGGTTCGG TCCAAGACCA CTAGTATTGA
421 TCATGGATCC TGAGCTTATA AAGGAAGTAC TCTCCAAAAT CTATCTTTAT CAAAAGCCCCG
481 GTGGAAATCC ATTAGCAACA CTATTGGTAC AAGGATTAGC AACCTATGAG GAAGACAAAT
541 GGGCCAAACA TAGAAAAATC ATCAATCCCG CTTTCCATCT AGAGAAGCTA AAGCATATGC
601 TTCCAGCTTT TCGCTTGAGC TGTAAGTGA TGCTGAGCAA ATGGGAAGAC ATTGTTTCAG
661 CTGAAGGCTC ACATGAGATA GATGTATGGC CTAACCTTGA GCAATTGAGT TGCGATGTGA
721 TCTCTCGGAC AGCTTTTGGC AATAGTTATG AAGAAGGTAG AAAGATTTTT GAACCTCAAA
781 AGGAACAAAC TCAGCATCTT GTGGAAGCTT TCCGCTCTGT TTATATCCCA GGAAGGAGAT
841 TTTTGCCAAC AAAGAGGAAT AGAAGAATGA AGGAAATAAA AAAGGAGGTT CGAGCGTCAA
901 TTAAAGGTAT TATTGATAAA AGATTGAAGG CAATGAAAGC AGGGGACACC AATAATGAGG
961 ATCTATTGGG ATATTGCTGG AATCAAATTT TAAAGAAATT GAACAGCGCG GAAACAAGGA
1021 TTTTGGAATG AGCATTGAAG ATGTCATTGA AGAATGCAAG TTATTCTATT TTGCTGGCCA
1081 AGAAACTACA TCAGTGTTCG TCCTATGGTC TCTAGTGTCTG TTGAGCAGGT ATCAAGATTG
1141 GCAGACACGG GCCAGAGAAG AAGTCTTGCA TGTCTTTGGG AGTCGGAAAC CAGATTTTGA
1201 TGAATTAAAT CATCTAAAAG TTGTGACAAT GATCATGTAC GAGTCTTTAA GGCTATATCC
1261 CTCCTAATA AACTTACCC GCCGGTGTA TGAAGACATT GTATTAGGAG AACTATCTCT
1321 ACCAGCTGGT GTCCTAGTCT CTTTGCCAAT GATTTTGTG CATCATGATG AAGAGATATG
1381 GGGTGAAGAT GCAAAGGAGT TCAAACCAGA GAGATTTAGA GAAGGATTGT CAAGTGCAAC
1441 AAAGGGTCAA CTTACATATT TTCCATTGG CTGGGGTCCT AGAATATGTA TTGGACAAAA
1501 TTTTGCCATG TTAGAAGCAA AGATGGCTCT GTCTATGATC CTGCAACGCT TCTCTTTTGA
1561 ACTGTCTCCG TCTTATGCAC ATGCCCCCTCA GTCCATATTA ACCGTTTCAGC CTCAATATGG
1621 TGCTCCACTT ATTTTCCACA AGCTATAATT TGGTACTTGT GAAAGGTGTC TTGTACAATA
1681 TGTTAGTAGA GTTTATTTCAG ACTTAGATAC ATGCTTC

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SEQ. ID. NO. 286

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1 METVEMIVKV SCAAIVITLL VCLWRVLNVV WFRPKKLEKL LRQVLYGDM KEFSGMIKEA
61 YSKPMSLSD VAPRMPPFFL ETIKKYGKRS FIWFGPRPLV LIMDP ELIKE VLSKIYLYQK
121 PGGNPLATLL VQGLATYEED KWAKHRKIIN PAFHLEKLKH MLPAFRLSCS EMLSKWEDIV
181 SAEGSHEIDV WPNLEQLSCD VISRTAFGNS YEEGRKIFEL QKEQTQHLVE AFRSVYIPGR
241 RFLPTKRNR MKEIKKEVRA SIKGIIDKRL KAMKAGDTNN EDLLGYCWNQ ILKKLNSAET
301 RILE

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FIG. 144

NAME D216-AG8  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 287

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1 CCAAAATGCA GTTCTTCAAC TTCATTTCCCT TTGTCTTTTT TGTGTCTTTC CTCTTTTTAT
61 TAAGGAAATG GAAGAACTCC AATAGCCAAA CCAAAGATT GCCTCCAGGT CCATGGAAAT
121 TACCTGTACT TGGAAAGCATG TTTCATTTGC TAGGTGGACC TCCACATCAT GTCCTTGGAG
181 ATTTAGCCAA AAAATATGGT CCACTTATGC ACCTTCAACT AGGTGAAGTT TCTGTAGTTT
241 CTGTTACTTC TCCTGAGATG GCAAAAGAAG TACTAAAAAC TCATGACCTC GCTTTTGCAT
301 CTAGGCCGTT ACTTTTGGCA GCCAAAATTG TCTGCTATAA TGGGACAGAC ATTGTCTTTT
361 CCCCCTATGG CGATTATTGG AGACAAACGC GTAAAATTTG TCTCTTGGAA TTGCTCAGTG
421 CCAAAAATGT TAGGTCATTC AGCTCAGTCA GACGAGATGA AGTTTCCAT ATGATTGAAT
481 TTTTTTCGAT CATCTTCTGG TAAGCCAGTT AATGTATCAA AAAGGATTC TCTATTCACA
541 ACCTCTATGA CATGTAGATC AGCCTTTGGA CAAGAATACA AGGAGCAAGA CGAATTCGCA
601 CAACTAGTAA AAAAAGTGTC AAGCTTAATG GAAGGGTTTG ATGTTGCTGA TATATTCCCT
661 TCATTGAAGT TTCTTCATGT GCTCAGTGGA ATGAAGGCTA AAGTTATGGA TGCACACCAT
721 GAGTTAGATG CCATTCTTGA AAAAATTATC AATGAGCACA AGAAAATTGC AACTGGAAAG
781 AATAATAATG AATTAGGAGG TGAAGGATTA ATTGACGTAC TGCTAAGACT TATGAAAGAG
841 GGAGGCCTTC AATTCCCGAT CACCAACGAC AACATCAAAG CTATTATTTT TGACATGTTT
901 GGTGCGGGAA CGGAAACTTC ATCAACCACA ATTGACTGGG CCATGGTCGA AATGATAAAG
961 AATCCAAGTG TATTCGCTAA AGCTCAAGCA GAGGTAAGAG AAGCCTTCAG AGAGAAAGAA
1021 ACTTTTGATG AAAATGATGT CGAGGAGTTG AAATACTTAA AATTGGTTAT CAAAGAACT
1081 TTCAGACTCC ATCCTCCATT TCCCCTTTTG CTCCAAGAG AATCTAGAGA AGAAACAGAT
1141 ATAAACGGCT ACACTATTCC TTTTAAAACA AACTTATGG TTAACGTTTC GGCTATTGGA
1201 AGAGATCCAA AATATTGGGA TGACGTGGAA AGTTTAAAGC CAGAGAGATT TGAGCACAAC
1261 TCTATGGATT TTATTGGTAA TAATTTTGAA TATCTTCCCT TTGGTAGTGG AAGGAGAATG
1321 TGCCCTGGGA TATCATTGGG TTTGGCTAAT GTTTATTTGC CACTAGCTCA ATTGTTATAT
1381 CATTTTGATT GGAAACTCCC TACTGGAATC AATTCAAGTG ACTTGGACAT GACTGAGTCG
1441 TCAGGAGTAA CTTGTGCTAG AAAGAGTGAT TTATACTTGA CTGCTACTCC ATATCAACTT
1501 TCTCAAGAGT GATGCAATGA TATCAACCTT TTGAATTTTC GTCAACCCCA CCAATAGTG

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SEQ. ID. NO. 288

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1 MQFFNFISFV FFVSFLFLLR KWKNSNSQTK RLPPGPWKLP VLGSFMHLLG GPPHHVLGDL
61 AKKYGPLMHL QLGEVSVVSV TSPEMAKEVL KTHDLAFASR PLLLAAKIVC YNGTDIVFSP
121 YGDYWRQTRK ICLLELLSAK NVRSFSSVRR DEVFHMIEFF SIIFW

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FIG. 145

NAME D243-AB3  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 289

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1  CCCCACCAAA AAATCATTTTC TCTCGTCTAA AATGGATCTT CTCTTACTAG AGAAGACCTT
61 AATTGGTCTT TTCTTTGCCA TTTTAATCGC TTTAATTGTC TCTAAACTTC GTTCAAAGCG
121 TTTTAAGCTT CCTCCAGGAC CAATTCCAGT ACCAGTTTTT GGTAATTGGC TTCAAGTTGG
181 TGATGATTTA AACCACAGAA ATCTTACTGA TTATGCCAAG AAATTTGGAG ATCTTTTCTT
241 GTTAAGAATG GGTCAACGTA ACTTAGTTGT TGTGTCATCT CCTGAATTAG CTAAAGAAGT
301 TTTACACACA CAAGGTGTTG AATTTGGTTC AAGAACAAGA AATGTTGTGT TTGATATTTT
361 TACTGGAAAA GGTCAAGATA TGGTTTTTAC TGTATATGGT GAACATTGGA GAAAAATGAG
421 GAGAATTATG ACTGTACCAT TTTTACTAA TAAAGTTGTG CAACAGTATA GAGGGGGGTG
481 GGAGTTTGAG GTGGCAAGTG TAATTGAGGA TGTGAAAAAA AATCCTGAAT CTGCTACTAA
541 TGGGATCGTA TTAAGGAGGA GATTACAATT AATGATGTAT AATAATATGT TTAGGATTAT
601 GTTTGATAGG AGATTTGAGA GTGAAGATGA TCCTTTGTTT GTTAAGCTTA AGGCTTTGAA
661 TGGTGAAAGG AGTAGATTGG CTCAAAGTTT TGAGTATAAT TATGGTGATT TTATTCCAAT
721 TTTGAGGCCT TTTTTTGAGA GGTTATTTGA AGATCTGTAA AGAAGTTAAG GAGAAGAGGC
781 TGCAGCTTTT CAAAGATTAC TTTGTTGATG AAAGAAAGAA GCTTTCGAAT ACCAAGAGCT
841 CGGACAGCAA TGCCCTAAAA TGTGCGATTG ATCACATTCT TGAGGCTCAA CAGAAGGGAG
901 AGATCAATGA GGACAACGTT CTTTACATTG TTGAAAACAT CAATGTTGCT GCAATTGAAA
961 CAACATTATG GTCAATTGAG TGGGGTATCG CCGAGCTAGT CAACCACCCT CACATCCAAA
1021 AGAAACTGCG CGACGAGATT GACACAGTTC TTGGACCAGG AGTGCAAGTG ACTGAACCAG
1081 ACACCCACAA GCTTCCATAC CTTCAGGCTG TGATCAAGGA GGCACTTCGT CTCGGTATGG
1141 CAATTCCTCT ATTAGTCCCA CACATGAACC TTCACGACGC AAAGCTTGGC GGGTTTGATA
1201 TTCCAGCAGA GAGCAAAATC TTGGTTAACG CTTGGTGTTT AGCTAACAC CCGGCTCATT
1261 GGAAGAAACC CGAAGAGTTC AGACCCGAGA GGTTCTTTGA AGAGGAGAAG CATGTTGAGG
1321 CCAATGGCAA TGACTTCAGA TATCTTCCGT TTGGCGTTGG TAGGAGGAGC TGCCCTGGAA
1381 TTATACTTGC ATTGCCAACT CTTGGCATCA CTTTGGGACG TTTGGTTCAG AACTTTGAGC
1441 TGTTGCCTCC TCCAGGCCAG TCGAAGCTCG ACACCACAGA GAAAGGTGGA CAGTTCAGTC
1501 TCCACATTTT GAAGCATTC ACCATTGTGT TGAAACCAAG GTCTTTCTGA ACTTTGTGAT
1561 CTTATTAATT AAGGGGTTCT GAAGAAATTT GATAGTGTG G

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SEQ. ID. NO. 290

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1  MDLLLLLEKTL IGLFFAILIA LIVSKLRSKR FKLPPGPIPV PVFGNWLQVG DDLNHRNLTD
61 YAKKFGDLFL LRMGQRNLVV VSSPELAKEV LHTQGVEFGS RTRNVVFDIF TGKGQDMVFT
121 VYGEHWRKMR RIMTVPEFTN KVVQQYRGW EFEEVASVIED VKKNPESATN GIVLRRRLQL
181 MMYNNMFRIM FDRRESEDD PLFVKLKALN GERSRLAQSF EYNYGDFIPI LRPFFERLFE
241 DL

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FIG. 146

87/111

NAME D250-AC11  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 291

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1 ATAATGCTCT TTCTACTCTT TGTAGCCCTT CCTTTCATTC TTATTTTTCT TCTTCCTAAA
61 TTCAAAAATG GTGGAAATAA CAGATTGCCA CCAGGTCCTA TAGGTTTACC ATTCATTGGA
121 AATTTGCATC AATATGATAG TATAACTCCT CATATCTATT TTTGGAAACT TTCCAAAAAA
181 TATGGCAAAA TCTTCTCATT AAAACTTGCT TCTACTAATG TGGTAGTAGT TTCTTCAGCA
241 AAATTAGCAA AAGAAGTATT GAAAAAACAA GATTTAATAT TTTGTAGTAG ACCATCTATT
301 CTTGGCCAAC AAAAAGTGTG TTATTATGGT CGTGATATTG CTTTTCGACC TTATAATGAT
361 TATTGGAGAG AAATGAGAAA AATTTGTGTT CTTTCATCTTT TTAGTTTAAA AAAAGTTCAA
421 TTATTTAGTC CAATTCGTGA AGATGAAGTT TTTAGAATGA TTAAGAAAAT ATCAAAACAA
481 GCTTCTACTT CACAAATTAT TAATTTGAGT AATTTAATGA TTTCATTAAC AAGTACAATT
541 ATTTGTAGAG TTGCTTTTGG TGTTAGGTTT GAAGAAGAAG CACATGCAAG GAAGAGATTT
601 GATTTTCTTT TGGCCGAGGC ACAAGAAATG ATGGCTAGTT TCTTTGTATC TGATTTTTTT
661 CCCTTTTTTA GTTAGATTGA CAAATTAAGT GGATTGACAT ATAGACTTGA GAGGAATTTT
721 AAGGATTTGG ATAATTTTTA TGAAGAACTC ATTGAGCAAC ATCAAAATCC TAATAAGCCA
781 AAATATATGG AAGGAGATAT TGTGATCTT TTGCTACAAT TGAAGAAAGA GAAATTAACA
841 CCACTTGATC TCACTATGGA AGATATAAAA GGAATTCTCA TGAATGTGTT AGTTGCAGGA
901 TCAGACACTA GTGCAGCTGC TACTGTTTGG GCAATGACAG CCTTGATAAA GAATCCTAAA
961 GCCATGGAAA AAGTTCGAAT AGAAATCAGA AAATCAGTTG GGAAGAAAGG CATTGTAAAT
1021 GAAGAAGATG TCCAAAACAT CCCTTATTTT AAAGCAGTGA TAAAGGAAAT ATTTAGATTG
1081 TATCCACCAG CTCCACTTTT AGTTCCAAGA GAATCAATGG AAAAAACCAT ATTAGAAGGT
1141 TATGAAATTC GGCCAAGAAC CATAGTTCAT GTTAACGCTT GGGCTATAGC AAGGGATCCT
1201 GAAATATGGG AAAATCCAGA TGAATTTATA CCTGAGAGAT TTTTGAATAG CAGTATCGAT
1261 TACAAGGGTC AAGATTTTGA GTTACTTCCA TTTGGTGCAG GCAGAAGAGG TTGCCCAGGT
1321 ATTGCACTTG GGGTTGCATC CATGGAACCT GCTTTGTCAA ATCTTCTTTA TGCATTTGAT
1381 TGGGAGTTGC CTTATGGAGT GAAAAAAGAA GACATCGACA CAAACGTTAG GCCTGGAATT
1441 GCCATGCACA AGAAAAACGA ACTTTGCCTT GTCCCAAAA AATTATTTAT AAATTATATT
1501 GGGACGTGGA TCTCATGCTA GTTCTGTGCG GTCAGCTAAG CTTA

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SEQ. ID. NO. 292

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1 MLFLLFVALP FILIFLLPKF KNGGNNRLPP GPIGLPFIGN LHQYDSITPH IYFWKLSKKY
61 GKIFSLKLAS TNVVVVSSAK LAKEVLKKQD LIFCSRPSIL GQQKLSYYGR DIAFAPYNDY
121 WREMRKICVL HLFSLKKVQL FSPIREDEVF RMIKKISKQA STSQIINLSN LMISLTSTII
181 CRVAFGVRFE EEAHARKRFD FLLAEAQEMM ASFFVSDFFP FLS.IDKLSG LTYRLERNFK
241 DLDNFYEELI EQHQNPNKPK YMEGDIVDLL LQLKKEKLTP LDLTMEDIKG ILMNVLVAGS
301 DTSAAATVWA MTALIKNPKA MEKVQLEIRK SVGKKGIVNE EDVQNIPYFK AVIKEIFRLY
361 PPAPLLVPRE SMEKTILEGY EIRPRTIVHV NAWAIARDPE IWENPDEFIP ERFLNSSIDY
421 KGQDFELLFP GAGRRGCPGI ALGVASMELA LSNLLYAFDW ELPYGVKKED IDTNVRPGIA
481 MHKKNELCLV PKKLFINYIG TWISC

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FIG. 147

88/111

NAME D205-AH4  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 293

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1 GTGAGGTTTG AATCCTCTGC CTCAATGAAA CTCACCAAAT TGGTTTTCTA ATTTCCATCT
61 AAAATATTGT CCAAAGCTAA AGATTCTTTC TCCTTAAATA GTCAACTTTA GTGGTTCCTC
121 TTCATTTTCAAT AGCTCAATCT TTCTTATTTT GATTCAACCA TGGAGAACCA ATACTCCTAC
181 TCATTCTCTT CCTACTTCTA CTTAGCTATA GTACTGTTTC TTCTTCCAAT TTTGGTCAAA
241 TATTTCTTCC ATCGGAGAAG AAATTTACCT CCAAGTCCAT TTTCTCTTCC AATAATTGGT
301 CACCTTTACC TTCTCAAGAA AACTCTCCAT CTCACTCTAA CATCCTTATC AGCTAAATAT
361 GGTCTGTGTT TATACCTCAA ATTGGGCTCT ATGCCTGTGA TTGTTGTGTC CTCACCATCT
421 GCTGTTGAAG AATGTTTAAC CAAGAATGAT ATCATATTCG CAAATAGGCC CAAGACCGTG
481 GCTGGTGACA AGTTTACCTA CAATTATACT GTTTATGTTT GGGCACCTA TGGCCAACCTT
541 TGGAGAATTC TTCGCCGATT AACTGTCGTT GAACCTTCTT CTTCACATAG CCTACAGAAA
601 ACTTCTATCC TTAGAGATCA AGAAGTTGCA ATATTTATCC GTTCGTTATA CAAATTCTCA
661 AAGGATAGTA GCAAAAAAGT CGATTTGACC AACTGGTCTT TTAACCTTGGT TTTCAATCTT
721 ATGACCAAAA TTATTGCTGG GAGACATATT GTGAAGGAGG AAGATGCTGG CAAGGAAAAG
781 GGCATTGAAA TTATTGAAAA ACTTAGAGGG ACTTTCTTAG TAACTACATC ATTCTTGAAT
841 ATGTGTGATT TCTTGCCAGT ATTCCAGGTGG GTTGGTTACA AAGGGCTGGA GAAGAAGATG
901 GCCTCAATTC ACAATAGAAG AAATGAATTC TTGAACAGCT TGCTTGATGA ATTTGACAC
961 AAGAAAAGTA GTGCTTCACA ATCTAACACA ACTGTTGGAA ACATGGAGAA GAAAACCACA
1021 CTGATTGAAA AGCTCTTGTC TCTTCAAGAA TCAGAGCCTG AATTCTACAC TGATGATATC
1081 ATCAAAAGTA TTATGCTGGT AGTTTTTGTG GCAGGAACAG AGACCTCATC AACAACCATC
1141 CAATGGGTAA TGAGGCTTCT TGTAGCTCAC CCTGAGGCAT TGTATAAGCT ACGAGCTGAC
1201 ATTGACAGTA AAGTTGGGAA TAAGCGCTTG CTGAATGAAT CAGACCTCAA CAAGCTTCCG
1261 TATTTGCATT GTGTTGTTAA TGAGACAATG AGATTATACA CTCCGATACC ACTTTTATTG
1321 CCTCATTATT CAACTAAAGA TTGTATTGTG GAAGGATATG ATGTACCAA ACATACAATG
1381 TTGTTTGTCA ACGCTTGGGC CATTACAGG GATCCCAAGG TATGGGAGGA GCCTGACAAG
1441 TTCAAGCCAG AGAGATTGGA GGCAACAGAA GGGGAAACAG AAAGGTTCAA TTACAAGCTT
1501 GTACCATTTG GAATGGGGAG AAGAGCGTGC CCTGGAGCTG ATATGGGGTT GCGAGCAGTT
1561 TCTTTGGCAT TAGGTGCACT TATTCAATGC TTTGACTGGC AAATTGAGGA AGCGGAAAGC
1621 TTGGAGGAAA GCTATAATTC TAGAATGACT ATGCAGACA AGCCTTTGAA GGTGTGTCTG
1681 ACTCCACGCG AAGATCTTGG CCAGCTTCTA TCCCAACTCT AAGGCAATTT ATCAATGCCA
1741 AACGTAATCT TCATCTACCA CTATG

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SEQ. ID. NO. 294

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1 MENQSYSFS SYFYLAIVLF LLPILVKYFF HRRRNLPSP FSLPIIGHLY LLKKTLLHLTL
61 TSLSAKYGPV LYKLGSMPV IVVSSPSAVE ECLTKNDIIF ANRPKTVAGD KFTYNYTVYV
121 WAPYQQLWRI LRRLTVVELF SSHSLQKTSI LRDQEVAFI RSLYKFSKDS SKKVDLTNWS
181 FTLVFNLMTK ILAGRHIVKE EDAGKEKGIE IIEKLRGTFL VTTSFLNMCD FLPVFRWVG
241 KGLEKKMASI HNRRNEFLNS LLDEFRRHKS SASQSNTTVG NMEKKTTLIE KLLSLQSESEP
301 EFYTDDIIS IMLVVFVAGT ETSSTTIQWV MRLLVAHPEA LYKLRADIDS KVGNKRLNE
361 SDLNKLPLYH CVVNETMRLY TPIPLLLPHY STKDCIVEGY DVPKHTMLFV NAWAIHRDPK
421 VWEEDPKFKP ERFEATEGET ERFNYKLVPF GMGRRACPGA DMGLRAVSLA LGALIQCDFDW
481 QIEEAESLEE SYNSRMTMQN KPLKVCTPR EDLGQLLSQL

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FIG. 148

NAME D267-AF10  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 295

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1 AACATCCTTT CCTTCTTCCA AAAATGGAGC TTCAATCTTC TCCTTTCAAT TTAATTTCTT
61 TGTTCTCTT CTTTTCTTTT CTTTTTATTC TAGTGAAGAA ATGGAATGCC AAAATCCCAA
121 AGTTAACCCTC AGGTCCGTGG AGGCTTCCCT TTATTGGAAG CCTCCATCAC TTGAAGGGAA
181 AACTTCCACA CCATAATCTT AGAGATCTAG CGCGAAAATA TGGACCTCTC ATGTACTTAC
241 AACTCGGAGA AATTCCTGTA GTTGTAATAT CTTCGCCACG TGTAGCAAAA GCTGTACTAA
301 AAACATCATGA TCTCGCTTTT GCAACTAGAC CACGATTCAT GTCCTCAGAC ATTGTGTTTT
361 ACAAAAGCAG GGACATCTCT TTTGCCCCAT TTGGTGATTA CTGGAGACAG ATGCGTAAAA
421 TATTGACTCA GGAAGCTCCTG AGCAACAAGA TGCTCAAGTC ATATAGCTTA ATCCGAAAGG
481 ATGAGCTCTC GAAGCTCCTC TCATCGATTC GTTGGGAAAC AGGTTCTGCA GTGAACATAA
541 ATGAAAAGCT TCTCTGGTTT ACAGAGTGCA TGACCTGTAG ATTAGCCTTT GGAAAAATAT
601 GCAATGATCG GGATGAGTTG ATCATGCTAA TTAGGGAGAT ATTAACATTA TCAGGAGGAT
661 TTGATGTGGG TGATTTGTTC CCTTCTGGA AATTACTTCA TAATATGAGC AACATGAAAG
721 CTAGGTTGAC GAATGTACAC CACAAGTATG ATTTAGTTAT GGAGAACATC ATCAATGAGC
781 ACCAAGAGAA TCATGCAGCA GGGATAAAGG GTAACAACGA ATGAGCTTCA ATTTCTATC GAAAATGACA
841 TCGATGCTCT ACTGAGGGCT AAGGAGAATA ATGAGCTTCA ATTTCTATC GAAAATGACA
901 ACATGAAAAGC AGTAATTCTG GACTTGTTTA TTGCTGGAAC TGAAACTTCA TATACTGCAA
961 TTATATGGGC ACTATCAGAA TTGATGAAGC ACCCAAGTGT GATGGCCAAG GCACAAGCTG
1021 AAGTGAGAAA AGTCTTCAAA GAAAATGAAA ATTTTCGACG AAATGATCTT GACAAGTTGC
1081 CATACTAAA ATCAGTGATT AAAGAAACAC TAAGGATGCA CCTTCCAGTT CCTTTGTTAG
1141 GGCCTAGAGA ATGCAGGGAC CAAACAGAGA TCGATGGCTA CACTGTACCT ATTAAGCTA
1201 GAGTTATGGT TAATGCTTGG GCGATAGGAA GAGATCCTGA AAGTTGGGAA ATCCTGAAA
1261 GTTTCAAACC GGAGCGATTT GAAAATACTT CTGTTGATCT TACAGGAAAT CACTATCAGT
1321 TCATTCCTTT CGGTTTCAAGG AGAAGAATGT GTCCAGGAAT GTCGTTTGGT TTAGTTAACA
1381 CAGGGCATCC TTTAGCCCAG TTGCTCTATT GCTTTGACTG GAAACTCCCT GACAAGGTTA
1441 ATGCAAATGA TTTTCGCACT ACTGAAACAA GTAGAGTTTT TGCAGCAAGC AAAGATGACC
1501 TCTACTTGAT TCCCACAAAT CACAGGGAGC AAGAATAGCT TAATTTAATG GAGTCTTGG
1561 AAGAATTAAA GAAGAAGGGC TATATAGGTG AGATTTTTTG TATGGTTGCA AGGTTTTTAG
1621 TTCATACAAT AAGACAATAC ATTATATTCC AGTATTGTGT ATCATGTATA ATAAGGTTCC
1681 TTTTGTTTTAA AAAA

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SEQ. ID. NO. 296

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1 MELQSSPFNL ISLELFFSFL FILVKKWNAK IPKLPPGPWR LPFIGSLHHL KGKLPHHNL
61 DLARKYGPLM YLQLGEIPVV VISSPRVAKA VLKTHDLAFA TRPRFMSSDI VFYKSRDISF
121 APFGDYWRQM RKILTQELLS NKMLKSYSLI RKDELSKLLS SIRLETGSAV NINEKLLWFT
181 SCMTCRLAFG KICNDRDELI MLIREILTLS GGFVDVGLFP SWKLLHNMSN MKARLTNVHH
241 KYDLVMENII NEHQENHAAG IKGNNEFGGE DMIDALLRAK ENNELQFFIE NDNMKAVILD
301 LFIAGTETSY TAIIWALSEL MKHPSVMAKA QAEVRKVFKE NENFDENDLD KLPYLKSVIK
361 ETLRMHPPVP LLGPRECRDQ TEIDGYTVPI KARVMVNAWA IGRDPESWED PESFKPERFE
421 NTSVDLTGNH YQFIPFGSGR RMCPGMSFGL VNTGHPLAQL LYCFDWWKLPD KVNANDFRTT
481 ETSRVFAASK DDLYLIPTNH REQE

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FIG. 149

90/111

NAME D284-AH5  
 ORGANISM NICOTIANA TABACUM  
 SEQ. ID. NO. 297

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1 CAATCAGTGG ATGCGGGAGT AATATATAAT ATGCAAGTTG TAGAAAGAGA AAAAAAAAAAT
61 CAAGTAGCTA TTCTATACTG GGGCACAAAT AGTGAGTGAA AATGGAGACT GTTCAAATCA
121 TAATAACAGC ATCTTGTGCT GCCATAATAA TTA CTCTAGT GGTGTGTATT TGGAGAGTAC
181 TGAATTGGGT TTGGTTCAGA CCAAAGAAGC TGGAAAAACT ATTGAGGAAA CAAGGTCTCA
241 AAGGCAACTC CTACAAGATT TTGTATGGGG ATATGAAGGA GCTTTCTGGT ATGATTAAGG
301 AAGCTAATTC CAAACCCATG AATCTTTCTG ATGATATTGC ACCAAGATTG GTGCCTTTCT
361 TTCTTGACAC CATCAAGAAA TATGGTAAAA AATCCTTTGT ATGGTTAGGT CCGAAACCAC
421 TGGTTCTTAT CATGGACCCCT GAGCTTATAA AGGAAATATT TTCCAAATAC TATCTGTATC
481 AAAAGCCTCA TGGAAATCCA GTTACCAAGC TATTAGTACA AGGACTAGTA AGCCTAGAGG
541 AAGACAAATG GGCCAAACAT AGAAAAATCA TCAATCCAGC TTTCCATCTA GAGAAGCTAA
601 AGCATATGCT TCCAGCTTTT TGCTTGAGCT GCACTGAGAT GCTGTGCAAA TGGGAAGATA
661 TTGTTTCAAT TAAGGGCTCA CATGAGATAG ATGTATGGCC TCACCTTGAA CAATTAAGTA
721 GCGATGTGAT CTCTCGGACA GCTTTTGGCA GTAACCTTGA AGAAGGTAAA AGGATATTTG
781 AACTTCAGAA GGAACAAGCT CAGTATTTTG TAGAAGCTAT ACGCTCGGT TATATACCAG
841 GCTGGAGGTT TTTGCCAACA AAGAGGAACA GAAGAATGAA GGAAGTTGAA AAGGATGTTT
901 GGGCCTCGAT AAGAGGCATT ATTGATAAAA GAGTGAAGGC AATGAAAGCA GGAGAGGCGA
961 GTAATGAGGA TCTACTTGGT ATATTGTTGG AATCTAATTT TACAGAAGCT GAACAGCATA
1021 GACACAAGGA TTCTGCGATG AGCATTGAAG AAGTCATTCA AGAATGCAAG TTATTCTATG
1081 TTGCTGGCCA AGAAACTACA TCAGTGTTGC TTGTGTGGAC TCTAATATTG TTGAGTAGGC
1141 ATCAAGATTG GCAGAGCCGA GCCAGAGAAG AGGTGTTTCA AGTCTTTGGT AATCAGAAAC
1201 CAGATTTTGA CGGATTGAAT CGTCTAAAAG TTGTGACAAT GATCTTGAT GAGTCTTTAA
1261 GGCTATACTC CCCAGTAGTG TCACTAATCC GGCGGCCTAA TGAGGATGCT ATATTAGGAA
1321 ATGTATCTCT GCCAGAAGGT GTGCTACTCT CATTACCACT GATCTTATTA CACCACGATG
1381 AAGAGATATG GGGTAAAGAT GCAAAGAAGT TCAATCCAGA AAGATTTAGA GATGGAGTCT
1441 CAAGTGCAAC AAAGGGTCAA GTCACTTTTT TTCCATTTAC TTGGGGTCCC AGAATATGCA
1501 TCGGACAAAA TTTTGCCATG TTAGAAGCAA AGACTGCTTT GGCTATGATC CTACAACGCT
1561 TCTCATTCGA ACTGTCTCCA TCTTATGCAC ATGCTCCTCA GTCCATATTA ACTATGCAAC
1621 CCAACATGG TGCTCCACTA ATTCTGCACA AAATATAGTT GTTACTTTA AGCAGTGTCT
1681 TGTTATATGT CAGAGAGTCC AAAATGTTTA ATTAAGGCTT GTAGAAGTGC CAAATGGAAC
1741 TTCATTTGCA TTCGTGGGTT GTAGATTGTT GTAATTGGAC AAGTATACTG TTTATTTTAG
1801 AGTTTTAAGA AAAAAAAAAA

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SEQ. ID. NO. 298

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1 METVQIIITA SCAAIITLV VCIWRVLNVV WFRPKKLEKL LRKQGLKGNS YKILYGDMKE
61 LSGMIKEANS KPMNLSDDIA PRLVPFFLDI IKKYGKKSFV WLGPPLVLI MDPFLIKEIF
121 SKYYLYQKPH GNPVTKLLVQ GLVSLEEDKW AKHRKIINPA FHLEKLKHL PAFCLSCTEM
181 LCKWEDIVSI KGSHEIDVWP HLEQLSSDVI SRTAFGSNFE EGKRI FELQK EQAQYFVEAI
241 RSVYIPGWRF LPTKRNRMRK EVEKDVRASI RGIIDKRVKA MKAGEASNED LLGILLESNF
301 TEAEQHRHKD SAMSIEEVIQ ECKLFYVAGQ ETTSVLLVWT LILLSRHQDW QSRAREEVFQ
361 VFGNQKPDFD GLNRLKVVTM ILYESLRLYS PVSILIRPN EDAILGNVSL PEGVLLSLPV
421 ILLHHDEEIIW GKDAKKFNPE RFRDGVSSAT KGQVTFPPFT WGPRI CIGQN FAMLEAKTAL
481 AMILQRFSE LSPSYAHAPQ SILTMQPOHG APLILHKI

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Figure 150: Amino Acid Identity of Group Members

## Group 1

AQLAINLVTSMLGHLHHFTWAPAPGVNPEDIDLEESPGTVTYMKNPIQAIPTPRLPAHLYGRVFDVDM SEQ ID No.:2 D58-BG7  
 |  
 AQLAINLVTSMLGHLHHFTWAPPPGVNPENIDLEESPGTVTYMKNPIQAIPTPRLPAHLYGRVFDVDM SEQ ID No.:4 D58-AB1  
 (98.5)

## Group 2

QLAINLVTSMLGHLFIILHGLRPRGLTRRIITWRRALAQ SEQ ID No.:8 D58-BE4

## Group 3

EGLAVRMVALSLGCIQCFDWQRIGEEELVDMTEGTGLTLPKAQPIVAKCSRPKMANLLSQI SEQ ID No.:10 D56-AH7  
 | | | |  
 EGLAIRMVALSLGCIQCFDWQRLGEGLVDKTEGTGLTLPKAQPIVAKCSRPIMANLLSQI SEQ ID No.:12 D13a-5  
 (93.5)

## Group 4

IGFATLVTHLTGFRLLQGFDGFSKPSNTPIDMTEGVGVTLPKVNQVEVLITPRLPSKLYLF SEQ ID No.:14 D56-AG10  
 | | | |  
 INFATLVTHLTGFRLLQGFDGFSNTPIDMTEGVGVTLPKVNQVEVLISPRLPSKLYVF SEQ ID No.:18 D34-62  
 (93.3)

## Group 5

IILALPILGITLGRVLQNFELLPPPGQSKLDTTEKGGQFSLHILKHSTIVLKPRSF SEQ ID No.:20 D56-AA7  
 |  
 IILALPILGITLGRVLQNFELLPPPGQSKLDTTEKGGQFSLHILKHSTIVMKPRSF SEQ ID No.:144 D185-BD3  
 | | |  
 IILALPILGITLGRVLQNFELLPPPGQSKLDTTEKGGQFSLHILKHSTIVLKPRSC SEQ ID No.:22 D56-AE1  
 (96.4)

## Group 6

IALGVASMELALSNNLLYAFDWELPFGMKKEDIDTNARPGITMHHKKNELYLIPKNYL SEQ ID No.:24 D35-BB7  
 | | | |  
 IALGVASMELALSNNLLYAFDWELPYGVKKENIDTNVRPGITMHHKKNELCLIPRNYL SEQ ID No.:26 D177-BA7  
 | |  
 IALGVASMELALSNNLLYAFDWELPYGVKKEDIDTNVRPGIAMHHKKNELCLVPKNYL SEQ ID No.:28 D56A-AB6  
 |||  
 IALGVASMELALSNNLLYAFDWELPYGVKKEDIDTNVRPGIAMHHKKNELCLVPKKLFINYIGTWISC SEQ ID No.:30 D144-AE2  
 (94.6)

## Group 7

ISFGLANAYLPLAQLLYHFDWELPTGIKPSDDLDELTVGVTAARKSDLYLVATPYQPPQN SEQ ID No.:32 D56-AG11  
 | | |  
 ISFGLANAYLPLAQLLYHFDWKLPAIEPSDDLDELTVGVTAARKSDLYLVATPYQPPQK SEQ ID No.:34 D179-AA1  
 (93.3)

## Group 8

MLFGLANVGQPLAQLLYHFDWKLPNGQSHENFDMTESPGISATRKDDLVLIIATPYDSY SEQ ID No.:36 D56-AC7  
 | | | |  
 MLFGLANVGQPLAQLLYHFDWKLPNGQTHQNFDMTESPGISATRKDDLIIATPAHS SEQ ID No.:38 D144-AD1  
 (91.2)

## Group 9

LLFGLVNVGHPLAQLLYHFDWKTLPGISSDSFDMTETDGVTAGRKDDLCLIATPFGLN

SEQ ID No.:40 D144-AB5

## Group 10

MSFGLVNTGHPPLAQLLYFFDWKFPHKVNAADFHTTETSRVFAASKDDLYLIPTNHMEQE

SEQ ID No.:42 D181-AB5

MSFGLVNTGHPPLAQLLYCFDWKLPDKVNANDEFRTTETSRVFAASKDDLYLIPTNHREQE						

(89.8)

SEQ ID No.:44 D73-Ac9

## Group 11

MQFGLALVTLPLAHLHLHNFWDWKLPEGINARDLDMTEANGISARREKDLIYLIATPYVSPLD

SEQ ID No.:46 D56-AC12

## Group 12

MTYALQVEHLTMAHLIQGFNYRTPNDEPLDMKEGAGITIRKVNPKVIIITPRLAPELY

SEQ ID No.:48 D58-AB9

MTYALQVEHLTMAHLIQGFNYKTPNDEALDMKEGAGITIRKVNPKVELIIAPRLAPELY								

(89.6)

SEQ ID No.:50 D56-AG9

MTYALQVEHLTMAHLIQGFNYKTPNDEALDMKEGAGITIRKVNPKVELIIITPRLAPELY								

(98.2)

SEQ ID No.:52 D56-AG6

MTYALQVEHLTMAHLIQGFNYRTPNDEPLDMKEGAGITIRKVNPKVELIIAPRLAPELY								

(94.8)

SEQ ID No.:54 D35-BG11

MTYALQVEHLTMAHLIQGFNYRTPNDEPLDMKEGAGITIRKVNPKVELIIAP-LAPELY								

(98.3)

SEQ ID No.:56 D35-42

MTYALQVEHLTMAHLIQGFNYRTPNDEPLDMKEGAGITIRKVNPAELIIAPRLAPELY								

(98.3)

SEQ ID No.:58 D35-BA3

MTYALQVEHLTIAHLIQGFNYKTPNDEPLDMKEGAGLTIRKVNPKVEVTTTARLAPELY								

(84.5)

SEQ ID No.:60 D34-57

MTYALQVEHLTIAHLIQGFNYKTPNDEPLDMKEGAGLTIRKVNPKVEVTITARLAPELY								

(98.3)

SEQ ID No.:62 D34-52

## Group 13

YSLGLKVIRVTLANMLHGFWKLPPEGMKPEDISVEEHYGLTTHPKFFVPVILESRSSDLYSPIT

SEQ ID No.:66 D56-AD10

## Group 14

YSLGIRIIRATLANLLHGFNWRLPNGMSPEDISMEEIYGLITHPKVALDVMMEPRLPNHLYK

SEQ ID No.:68 D56-AA11

## Group 15

INFSIPLVELALANLLFHYNWSLPEGMLAKDVMEEALGITMHKKSPLCLIVASHYTC

SEQ ID No.:70 D177-BD5

INFSIPLVELALANLLFHYNWSLPEGMLPKDVMEEALGITMHKKSPLCLIVASHYNLL								

(94.7)

SEQ ID No.:84 D177-BD7

## Group 16

MQLGLYALEMAVAHLLLCFTWELPDGMKPSELKMDDIFGLTAPRANRLVAVPSPRLLCPLY

SEQ ID No.:74 D58-BC5

MQLGLYALEMAVAHLLHCFTWELPDGMKPSELKMDDIFGLTAPRANRLVAVPTPRLLCPLY								

(96.7)

SEQ ID No.:76 D58-AD12

MQLGLYALEMAVAHLLHCFTWELPDGMKPSELKMDDIFGLTAPKANRLVAVPTPRLLCPLY								

(98.4)

SEQ ID No.:72 D56A-AG10

## Group 17

MLWSASIVRVSYLTCIYRFQVYAGSVFRVA

SEQ ID No.:78 D56-AC11

MLWSASIVRVSYLTCTIYREQVYAGSVSRVA

(96.7)  
SEQ ID No.:88 D56-AD6F

**Group 18**

LNFMLEAKMALILQHAFELSPSYAHAPHHTITLQPHGAPLILRL

SEQ ID No.:90 D73A-AD6

**Group 19**

QNFALILEAKMAIAMILQRESFELSPSYTHSPYTVVTLKPKYGAPLIMHRL  
| | | | | | | | | |  
QNFAMLEAKMALSMILQRESFELSPSYAHAPQSILTVQPOYGAPLIFHKL  
| | | | | | | | | |  
INFAMTEAKMAMAMILQRESFELSPSYTHAPQSVITMQPOYGAPLILHKL  
| | | | | | | | | |  
INFAMAEAKMAMAMILQRESFELSPSYTHAPQSVITMQPOYGAPLILHKL  
| | | | | | | | | |  
QNFAMMEAKMAVAMILHKFSFELSPSYTHAPFAIVTTHPQYGAPLLMRRL  
| | | | | | | | | |  
QNFAMMEAKMAVAMILQKFSFELSPSYTHAPFAIVTTHPQYGAPLLMRRL

SEQ ID No.:96 D70A-AB5  
(72.0)  
SEQ ID No.:100 D70A-AB8  
(82.0)  
SEQ ID No.:102 D70A-BH2  
(98.0)  
SEQ ID No.:104 D70A-AA4  
(70.0)  
SEQ ID No.:108 D70A-BA9  
(98.0)  
SEQ ID No.:106 D70A-BA1

**Group 20**

QNFAMLEAKMAMAMILKTYAFELSPSYAHAPHPLLLQPQYGAQLILYKL

SEQ ID No.:110 D70A-BD4

**Group 21**

YSMGLKAIQASLANLLHGFNWSLPDNMTPEDLNMDEIFGLSTPKKFPLATVIEPRLSPKLYSV  
| | | | | | | | | |  
YSLGLKEIQASLANLLHGFNWSLPDNMTPEDLNMDEIFGLSTPKKFPLATVIEPRLSPKLYSV  
| | | | | | | | | |  
HSLGLKVIQASLANLLHGFNWSLPDNMTPEDLNMDEIFGLSTPKKFPLATVIEPRLSPKLYSV

SEQ ID No.:112 D181-AC5  
(96.8)  
SEQ ID No.:114 D144-AH1  
(96.8)  
SEQ ID No.:116 D34-65

**Group 22**

LCFPCLISSYILALNVNLYHNFLQISPSISY

SEQ ID No.:118 D35-BG2

**Group 23**

SGLAQCVVGLALATLVQCFEWKRVSEEVVDLTEGKGLTMPKPEPLMARCEARDIFHKVLSEIS

SEQ ID No.:120 D73A-AH7

**Group 24**

LGLATVHVNLMILARMIQEFESAYPENRKVDLLRNWNLLW  
| | | | | | | | | |  
LGLATVHVNLMILARMIQEFESAYPENRKVDTEKLEFTVVMKNPLRAKVKPRMQVV  
| | | | | | | | | |  
LGLATVHVNLMILARTIQEFESAYPENRKVDTEKLEFTVVMKNPLRAKVKPRMQVV

SEQ ID No.:136 D185-BG2  
(77.5)  
SEQ ID No.:122 D58-AA1  
(98.2)  
SEQ ID No.:134 D185-BC1

## Group 25

YALAMLHLEYFVANLVWHFRWEAVEGDDVDLSEKLEFTVVMKNPLRARICPRVNSI

SEQ ID No.:124 D73A-AE10

## Group 26

QQVGLLRTTIFIASLLSEYKPKPRSHQKQVELTDINPASWLHSIKGELLVDAIPRKKAFF

SEQ ID No.:126 D56A-AC12

## Group 27

ITFAKFVNELALARLMEHFDLSLPKGVKHELDVVEEAAGITVRRKFLLAVATPCS

SEQ ID No.:128 D177-BF7  
(98.2)

ITFAKFVNELALARLMEHFDLSLPKGVKHADLDVVEEAAGITVRRKFLLAVATPCS

SEQ ID No.:140 D185-BD2

## Group 28

QRYAINHMLFLTALETALIDFKRHKTGDCDDIAYIPTIAPKDDCKVFLSQRCTRFPFSFS

SEQ ID No.:130 D73A-AG3

## Group 29

MSFGLANLYLPLAQLLYHFDWKLPTGIKPRDLDTLSGITIARKGDLYLNATPYQPSRE

SEQ ID No.:132 D70A-AA12  
(80.0)|                   | | | | | | | |  
ISFGLANVYLPLAQLLYHFDWKLPTGINSSDLDMTESSGVTCARKSDLYLTATPYQLSQE

SEQ ID No.:86 176-BF2

## Group 30

QNFAMLEAKTTLAMILQRFSFELSPSYAHAPQSIITCNPSMVLHLCIKYSLLLVS SVSFYVKHESKMLRLVELQNGNAFALVHCRL

SEQ ID No.:146 D176-BC3

## Group 31

ADMGLRAVSLALGALIQCFDWQIEEAESLEESYNSRMTMKNKPLKVCTPREDLGQLLSQL

SEQ ID No.:148 D176-BB3

## Group 32

MNYSLQVEHLSIAHMIQGFSTATTNEPLDMKQGVGLTLPKKT DVEVLITPRLPPTLYQY

SEQ ID No.:6 D186-AH4

The percentage identity between most related pairs is noted in (0.0%). Each group had at least 70% identity to another group member. Group 19 contained the lowest percentage identity at 70.0%.

FIGURE 151: COMPARISON OF SEQUENCE GROUPS

ALIGNMENT OF GROUP 1

D58-BG7	GCACAACCTTGCTATCAACTTGGTCACATCTATGTTGGGTCATTGTTGCATCATTTTACA	SEQ ID No 1
D58-AB1	GCACAACCTTGCTATCAACTTGGTCACATCTATGTTGGGTCATTGTTGCATCATTTTACG	SEQ ID No 3
D58-BE4	GCACAACCTTGCTATCAACTTGGTCACATCTATGTTGGGTCATTGTT-CATCATTTTACA *****	SEQ ID No 7
D58-BG7	TGGGCTCCGGCCCCGGGGTTAACCCGGAGGATATTGACTTGGAGGAGAGCCCTGGAACA	
D58-AB1	TGGGCTCCGGCCCCGGGGTTAACCCGGAGGATATTGACTTGGAGGAGAGCCCTGGAACA	
D58-BE4	TGGGCTCCGGCCCCGGGGTTAACCCGGAGGATATTGACTTGGAGGAGAGCCCTGGAACA *****	
D58-BG7	GTAACCTTACATGAAAAATCCAATACAAGCTATTCCTACTCCAAGATTGCCTGCACACTTG	
D58-AB1	GTAACCTTACATGAAAAATCCAATACAAGCTATTCCTACTCCAAGATTGCCTGCACACTTG	
D58-BE4	GTAACCTTACATGA----- *****	
D58-BG7	TATGGACGTGTGCCAGTGGATATGTAA	
D58-AB1	TATGGACGTGTGCCAGTGGATATGTAA	
D58-BE4	-----	

PERCENT IDENTITY OF GROUP 1

	D58-BG7	D58-BE4	D58-AB1	
D58-BG7	***	96.2	98.1	SEQ ID No 1
D58-BE4		***	94.0	SEQ ID No 7
D58-AB1			***	SEQ ID No 3

ALIGNMENT OF GROUP 2

D56-AH7	GAAGGATTGGCTGTTTGAATGGTTGCCTTGTTCATTGGGATGTATTATTCAATGTTTGTAT	SEQ ID No 9
D13a-5	GAAGGATTGGCTATTTCGAATGGTTGCATTGTTCATTGGGATGTATTATTCAATGCTTTGTAT *****	SEQ ID No 11
D56-AH7	TGGCAACGAATCGGCGAAGAATTGGTTGATATGACTGAAGGAACTGGACTTACTTTGCCT	
D13a-5	TGGCAACGACTTGGGGAAGGATTGGTTGATAAGACTGAAGGAACTGGACTTACTTTGCCT *****	
D56-AH7	AAAGCTCAACCTTTGGTGGCCAAGTGTAGCCACGACCTAAAAATGGCTAATCTTCTCTCT	
D13a-5	AAAGCTCAACCTTTAGTGGCCAAGTGTAGCCACGACCTATAATGGCTAATCTTCTTTCT *****	
D56-AH7	CAGATTTGA	
D13a-5	CAGATTTGA *****	

PERCENT IDENTITY OF GROUP 2

	D56-AH7	D13a-5	
D56-AH7	***	93.7	SEQ ID No 9
D13a-5		***	SEQ ID No 11

FIGURE 151: COMPARISON OF SEQUENCE GROUPS

ALIGNMENT OF GROUP 3

```

D56-AG10      ATAGGTTTTCGCACTTTAGTGACACATCTGACTTTTGGTCGCTTGCTTCAAGGTTTGTGAT  SEQ ID 1
                |
D35-33        ATAGGCTTTTCGCACTTTAGTGACACATCTGACTTTTGGTCGCTTGCTTCAAGGTTTGTGAT  SEQ ID 1
                |||
D34-62        ATAAATTTTCGCACTTTAGTGACACATCTGACTTTTGGTCGCTTGCTTCAAGGTTTGTGAT  SEQ ID 1
                *****
D56-AG10      TTTAGTAAGCCATCAAACACGCCAATTGACATGACAGAAGGCGTAGGCGTTACTTTGCCT
D35-33        TTTAGTAAGCCATCAAACACGCCAATTGACATGACAGAAGGCGTAGGCGTTACTTTGCCT
                |
D34-62        TTTAGTACGCCATCAAACACGCCAATTAGACATGACAGAAGGCGTAGGCGTTACTTTGCCT
                *****
D56-AG10      AAGGTTAATCAAGTTGAAGTTCTAATTACCCCTCGTTTACCTTCTAAGCTTTATTTATTTGA
                |
D35-33        AAGGTTAATCAAGTTGAAGTTCTAATTACCCCTCGTTTACCTTCTAAGCTTTATTTATTTGA
                |
D34-62        AAGGTAAATCAAGTTGAAGTTCTAATTAGCCCTCGTTTACCTTCTAAGCTTTATGTATTCTGA
                *****

```

PERCENT IDENTITY OF GROUP 3

	<u>D56-AG10</u>	<u>D35-33</u>	<u>D34-62</u>	
D56-AG10	***	98.9	95.1	SEQ ID No 13
D35-33		***	94.4	SEQ ID No 15
D34-62			***	SEQ ID No 17

ALIGNMENT OF GROUP 4

```

D56-AA7      ATTATACTTGCAATGCCAATCTTGGCATCACTTGGGACGTTTGGTTCAGAACTTTGAG
                |
D56-AE1      ATTATACTTGCAATGCCAATCTTGGCATTACTTTGGGACGTTTGGTTCAGAACTTTGAG
                |
D185-BD3     ATTATCCTTGCACTGCCAATCTTGGCATTACCTTGGGACGCTTGGTGCAGAACTTTGAG
                *****
D56-AA7      CTGTTGCCCTCCTCCAGGCCAGTCGAAGCTCGACACCACAGAGAAAGGTGGACAGTTCAGT
D56-AE1      CTGTTGCCCTCCTCCAGGCCAGTCGAAGCTCGACACCACAGAGAAAGGTGGACAGTTCAGT
                |
D185-BD3     TTGTTGCCCTCCTCCAGGACAGTCAAAGCTTGACACAACAGAGAAAGGCGGGCAATTTCAGT
                *****
D56-AA7      CTCCACATTTTGAAGCATTCACCATTGTGTTGAAACCAAGGTCTTTCTGA
                |
D56-AE1      CTCCATATTTTGAAGCATTCACCATTGTGTTGAAACCAAGGTCTTGTCTGA
                |
D185-BD3     CTGCACATTTTGAAGCATTCACCATTGTGATGAAACCAAGATCTTTTAA
                *****

```

PERCENT IDENTITY OF GROUP 4

	<u>D56AA7</u>	<u>D56-AE1</u>	<u>D185-BD3</u>	
D56AA7	***	98.2	87.7	SEQ ID No 19
D56-AE1		***	87.1	SEQ ID No 21
D185-BD3			***	SEQ ID No 143

FIGURE 151: COMPARISON OF SEQUENCE GROUPS

ALIGNMENT OF GROUP 5

```

D56A-AB6      ATTGCACCTGGGGTTGCATCCATGGAACCTTGCTTTGTCAAATCTTCTTTATGCATTGAT  SEQ ID No 27
                |               |
D35-BB7      ATTGCACCTGGGGTTGCATCAATGGAACCTTGCTTTGTCAAATCTTCTTTATGCATTGAT  SEQ ID No 23
                |               |
D177-BA7      ATTGCACCTGGGGTTGCATCCATGGAACCTTGCTTTGTCAAATCTTCTTTATGCATTGAT  SEQ ID No 25
                |               |
D144-AE2      ATTGCACCTGGGGTTGCATCCATGGAACCTTGCTTTGTCAAATCTTCTTTATGCATTGAT  SEQ ID No 29
                |               |
                *****

D56A-AB6      TGGGAGTTGCCTTATGGAGTGAAAAAAGAAGACATCGACACAAACGTTAGGCCTGGAATT
                |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
D35-BB7      TGGGAGTTACCTTTTGGGAATGAAAAAAGAAGACATTGACACAAACGCCAGGCCTGGAATT
                |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
D177-BA7      TGGGAGTTACCTTACGGAGTGAAAAAAGAAAACATTGACACAAATGTCAGGCCTGGAATT
                |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
D144-AE2      TGGGAGTTGCCTTATGGAGTGAAAAAAGAAGACATCGACACAAACGTTAGGCCTGGAATT
                |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
                *****

D56A-AB6      GCCATGCACAAGAAAAACGAACCTTGCCTTGTCCTCCCAAAAAA-TTATTTATAA-----
                |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
D35-BB7      ACCATGCATAAGAAAAACGAACCTTTATCTTATCCCTAAAAA-TTATCTATAG-----
                |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
D177-BA7      ACCATGCATAAGAAAAACGAACCTTGCCTTATCCCTAGAAA-TTATCTATAG-----
                |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
D144-AE2      GCCATGCACAAGAAAAACGAACCTTGCCTTGTCCTCCCAAAAAAATTATTATAAATAT
                |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
                *****

D56A-AB6      -----
D35-BB7      -----
D177-BA7      -----
D144-AE2      |||||
                ATTGGGACGTGGATCTCATGCTAG

```

PERCENT IDENTITY OF GROUP 5

	D56A-AB6	D35-BB7	D144-AE2	D177-BA7	
D56A-AB6	***	90.6	97.1	91.8	SEQ ID No 27
D35-BB7		***	87.7	93.0	SEQ ID No 23
D144-AE2			***	88.9	SEQ ID No 29
D177-BA7				***	SEQ ID No 25

ALIGNMENT OF GROUP 6

```

D56-AG11      ATTTCGTTTGGTTTAGCTAATGCTTATTGGCATTGGCTCAATTACTTTATCACTTTGAT
                |               |
D179-AA1      ATTTCGTTTGGCTTAGCTAATGCTTATTGGCATTGGCTCAATTACTATATCACTTCGAT
                |               |
                *****

D56-AG11      TGGGAACCTCCCACTGGAATCAAACCAAGCGACTTGGACTTGACTGAGTTGGTTGGAGTA
                |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
D179-AA1      TGGAAACTCCCTGCTGGAATCGAACCAAGCGACTTGGACTTGACTGAGTTGGTTGGAGTA
                |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
                ***

D56-AG11      ACTGCCGCTAGAAAAAGTGACCTTTACTTGGTTGCGACTCCTTATCAACCTCCTCAAACTGA
                |               |
D179-AA1      ACTGCCGCTAGAAAAAGTGACCTTTACTTGGTTGCGACTCCTTATCAACCTCCTCAAAAGTGA
                |               |
                *****

```

FIGURE 151: COMPARISON OF SEQUENCE GROUPS

PERCENT IDENTITY OF GROUP 6

	SEQ ID No 31	SEQ ID No 33
D56-AG11	D56-AG11	D179-AA1
D179-AA1	***	95.6
		***
		SEQ ID No 31
		SEQ ID No 33

ALIGNMENT OF GROUP 7

D56-AC7	ATGCTATTGGTTTAGCTAATGTTGGACAACCTTTAGCTCAGTTACTTTATCACTTCGAT	SEQ ID No 35
D144-AD1	ATGCTATTGGTTTAGCTAATGTTGGACAACCTTTAGCTCAGTTACTTTATCACTTCGAT	SEQ ID No 37
	*****	
D56-AC7	TGGAAACTCCCTAATGGACAAAGTCATGAGAATTCGACATGACTGAGTCACCTGGAATT	
D144-AD1	TGGAAACTCCCTAATGGACAAAGTCACCAAAATTCGACATGACTGAGTCACCTGGAATT	
	***** * *	
D56-AC7	TCTGCTACAAGAAAGGATGATCTTGTGTTTGATTGCCACTCCTTATGATTCTTATTAA	
D144-AD1	TCTGCTACAAGAAAGGATGATCTTGTGTTTGATTGCCACTCCTGCTCATTCTTGA	
	***** * *	

Deleted: [ ]

PERCENT IDENTITY OF GROUP 7

	D144-AD1	D56-AC7
D144-AD1	***	94.3
D56-AC7F		***
		SEQ ID No 37
		SEQ ID No 35

Deleted: [ ]

ALIGNMENT OF GROUP 9

D181-AB5	ATGTCGTTTGGTTTAGTTAACAACCTGGGCATCCTTTAGCTCAGTTGCTCTATTCTTTGAC	SEQ ID No 41
D73-AC9	ATGTCGTTTGGTTTAGTTAACAACAGGGCATCCTTTAGCCAGTTGCTCTATTGCTTTGAC	SEQ ID No 43
	*****	
D181-AB5	TGGAAATCCCTCATAAGGTTAATGCAGCTGATTTTCACACTACTGAAACAAGTAGAGTT	
D73-AC9	TGGAAACTCCCTGACAAGGTTAATGCAATGATTTTCGCACTACTGAAACAAGTAGAGTT	
	***** * *	
D181-AB5	TTTGCAGCAAGCAAAGATGACCTCTACTTGATTCCCAACAATCACATGGAGCAAGAGTAG	
D73-AC9	TTTGCAGCAAGCAAAGATGACCTCTACTTGATTCCCAACAATCAGGGAGCAAGAGTAG	
	***** * *	

PERCENT IDENTITY OF GROUP 9

	D181-AB5	D73-AC9
D181-AB5	***	92.8
D73-AC9		***
		SEQ ID No 41
		SEQ ID No 43

Deleted: [ ]

FIGURE 151: COMPARISON OF SEQUENCE GROUPS

ALIGNMENT OF GROUP 11

```

D58-AB9      ATGACTTATGCATTGCAAGTGGAAACACCTAACAAATGGCACATTTGATCCAGGGTTTCAAT  SEQ ID No 47
D56-AG9      ATGACTTATGCATTGCAAGTGGAAACACCTAACAAATGGCACATTTAATCCAGGGTTTCAAT  SEQ ID No 49
D35-BG11     ATGACTTATGCATTGCAAGTGGAAACACTTAACAATGGCACATTTGATCCAAGGTTTCAAT  SEQ ID No 53
D34-25      ATGACTTATGCATTACAAGTGGAAACACCTAACAAATAGCACATTTGATCCAGGGTTTCAAT  SEQ ID No 63
D35-BA3     ATGACTTATGCATTGCAAGTGGAAACACTTAACAATGGCACATTTGATCCAAGGTTTCAAT  SEQ ID No 57
D34-52      ATGACTTATGCATTACAAGTGGAAACACCTAACAAATAGCACATTTGATCCAGGGTTTCAAT  SEQ ID No 61
D56-AG6     ATGACTTATGCATTGCAAGTGGAAACACCTAACAAATGGCACATTTAATCCAGGGTTTCAAT  SEQ ID No 51
D35-42      ATGACTTATGCATTGCAAGTGGAAACACTTAACAATGGCACATTTGATCCAAGGTTTCAAT  SEQ ID No 55
D34-57      ATGACTTATGCATTACAAGTGGAAACACCTAACAAATAGCACATTTGATCCAGGGTTTCAAT  SEQ ID No 59
*****

D58-AB9      TACAGAACTCCAACTGATGAGCCCTTGGATATGAAAGAAGGTGCAGGCATAACTATACGT
D56-AG9      TACAAAACCTCCAAATGACGAGGCCCTTGGATATGAAGGAAGGTGCAGGCATAACTATACGT
D35-BG11     TACAGAACTCCAAATGACGAGGCCCTTGGATATGAAGGAAGGTGCAGGCATAACTATACGT
D34-25      TACAAAACCTCCAAATGACGAGGCCCTTGGATATGAAGGAAGGTGCAGGATTAACATACGT
D35-BA3     TACAGAACTCCAAATGACGAGGCCCTTGGATATGAAGGAAGGTGCAGGCATAACTATACGT
D34-52      TACAAAACCTCCAAATGACGAGGCCCTTGGATATGAAGGAAGGTGCAGGATTAACATACGT
D56-AG6     TACAAAACCTCCAAATGACGAGGCCCTTGGATATGAAGGAAGGTGCAGGCATAACAATACGT
D35-42      TACAGAACTCCAAATGACGAGGCCCTTGGATATGAAGGAAGGTGCAGGCATAACTATACGT
D34-57      TACAAAACCTCCAAATGACGAGGCCCTTGGATATGAAGGAAGGTGCAGGATTAACCATACGT
****

D58-AB9      AAGGTAATCCTGTGAAAGTGATAATTACGCCCTCGCTTGGCACCTGAGCTTTATTAA
D56-AG9      AAGGTAATCCTGTGGAAGTGATAATAGCGCCTCGCCTGGCACCTGAGCTTTATTAA
D35-BG11     AAGGTAATCCTGTGGAAGTGATAATAGCGCCTCGCCTGGCACCTGAGCTTTATTAA
D34-25      AAAGTAATCCTGTAGAAAGTGACAATTACGGCTCGCCTGGCACCTGAGCTTTATTAA
D35-BA3     AAGGTAATCCTGCGGAAGTGATAATAGCGCCTCGCCTGGCACCTGAGCTTTATTAA
D34-52      AAAGTAATCCTGTAGAAAGTGACAATTACGGCTCGCCTGGCACCTGAGCTTTATTAA
D56-AG6     AAGGTAATCCAGTGAATTGATAATAACGCCCTCGCTTGGCACCTGAGCTTTACTAA
D35-42      AAGGTAATCCTGTGGAAGTGATAATAGCGCCCC--TGGCACCTGAGCTTTATTAA
D34-57      AAAGTAATCCTGTAGAAAGTGACAACACGGCTCGCCTGGCACCTGAGCTTTATTAA
**

```

FIGURE 151: COMPARISON OF SEQUENCE GROUPS

PERCENT IDENTITY OF GROUP 11

	D58-AB9		D56-AG6		D35-42		D34-57		D34-25	
			D56-AG9	D35-BG11	D35-BA3		D34-52			
D58-AB9	***	93.8	93.2	94.3	90.8	93.2	90.9	92.0	91.5	SEQ ID No 47
D56-AG9		***	96.6	97.2	94.2	96.6	91.5	92.6	92.0	SEQ ID No 49
D56-AG6			***	93.8	90.2	92.6	90.3	90.9	90.3	SEQ ID No 51
D35-BG11				***	97.1	99.4	90.9	92.0	91.5	SEQ ID No 53
D35-42					***	96.5	87.3	88.4	87.9	SEQ ID No 55
D35-BA3						***	90.3	91.5	90.9	SEQ ID No 57
D34-57							***	98.9	98.3	SEQ ID No 59
D34-52								***	99.4	SEQ ID No 61
D34-25									***	SEQ ID No 63

ALIGNMENT OF GROUP 14

D177-BD7	ATTAAATTTTCAATACCACCTTGTTGAGCTTGCACTTGCTAATCTATTGTTTCATTATAAT	SEQ ID No 83
D177-BD5	ATTAAATTTTCAATACCACCTTGTTGAGCTTGCACTTGCTAATCTATTGTTTCATTATAAT	SEQ ID No 69
*****		
D177-BD7	TGGTCACTTCCTGAGGGGATGCTACCTAAGGATGTTGATATGGAAGAAGCTTTGGGGATT	
D177-BD5	TGGTCACTTCCTGAGGGGATGCTAGCTAAGGATGTTGATATGGAAGAAGCTTTGGGGATT	
*****		
D177-BD7	ACCATGCACAAGAAATCTCCCTTTGCTTAGTAGCTTCTCATTATAACTTGTGTGA	
D177-BD5	ACCATGCACAAGAAATCTCCCTTTGCTTAGTAGCTTCTCATTATA-CTTGTGTA--	
*****		

PERCENT IDENTITY OF GROUP 14

	D177-BD7	D177-BD5	
D177-BD7	***	96.0	SEQ ID No 83
D177-BD5		***	SEQ ID No 69

ALIGNMENT OF GROUP 15

D56A-AG10	ATGCAACTTGGGCTTTATGCATTGGAAATGGCTGTGGCCCATCTTCTTCATTGTTTACT	SEQ ID No 71
D58-AD12	ATGCAACTTGGGCTTTATGCATTGGAAATGGCTGTGGCCCATCTTCTTCATTGTTTACT	SEQ ID No 75
D58-BC5	ATGCAACTTGGGCTTTATGCATTAGAAATGGCAGTGGCCCATCTTCTTCTTTGCTTTACT	SEQ ID No 73
*****		
D56A-AG10	TGGGAATTGCCAGATGGTATGAAACCAAGTGAGCTTAAATGGATGATATTTTGGACTC	
D58-AD12	TGGGAATTGCCAGATGGTATGAAACCAAGTGAGCTTAAATGGATGATATTTTGGACTC	
D58-BC5	TGGGAATTGCCAGATGGTATGAAACCAAGTGAGCTTAAATGGATGATATTTTGGACTC	
*****		
D56A-AG10	ACTGCTCCAAAAGCTAATCGACTCGTGGCTGTGCCTACTCCACGTTTGTGTGTCCTT	
D58-AD12	ACTGCTCCAAAGCTAATCGACTCGTGGCTGTGCCTACTCCACGTTTGTGTGTCCTT	
D58-BC5	ACTGCTCCAAAGCTAATCGACTCGTGGCTGTGCCTAGTCCACGTTTGTGTGTCCTT	
*****		

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FIGURE 151: COMPARISON OF SEQUENCE GROUPS

D56A-AG10      TATTAA  
 D58-AD12      TATTAA  
 D58-BC5      TATTAA  
              \*\*\*\*\*

PERCENT IDENTITY OF GROUP 15

	D56A-AG10	D58-AD12	D58-BC5	
D56A-AG10	***	99.5	95.7	SEQ ID No 71
D58-AD12		***	96.2	SEQ ID No 75
D58-BC5			***	SEQ ID No 73

ALIGNMENT OF GROUP 16

D56-AD6      ATGCTTTGGAGTGGAGTATAGTGGCGGTCAGCTACCTAAGTGTATTTATAGATTCCAA      SEQ ID No 87  
 D56-AC11      ATGCTTTGGAGTGGAGTATAGTGGCGGTCAGCTACCTAAGTGTATTTATAGATTCCAA      SEQ ID No 77  
 D35-39      ATGCTTTGGAGTGGAGTATAGTGGCGGTCAGCTACCTAAGTGTATTTATAGATTCCAA      SEQ ID No 79  
 D58-BH4      ATGCTTTGGAGTGGAGTATAGTGGCGGTCAGCTACCTAAGTGTATTTATAGATTCCAA      SEQ ID No 81  
              \*\*\*\*\*  
 D56-AD6      GTATATGCTGGGCTGTGTTCAGAGTAGCATGA  
 D56-AC11      GTATATGCTGGGCTGTGTTCAGAGTAGCATGA  
 GTATATGCTGGGCTGTGTTCAGAGTAGCATGA  
 D58-BH4      GTATATGCTGGGCTGTGTTCAGAGTAGCATGA  
              \*\*\*\*\*

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PERCENT IDENTITY OF GROUP 16

	D56-AC11	D56-AD6	D58-BH4	D35-39	
D56-AC11	***	98.7	98.7	98.7	SEQ ID No 77
D56-AD6		***	98.7	98.7	SEQ ID No 87
D58-BH4			***	98.7	SEQ ID No 81
D35-39				***	SEQ ID No 79

ALIGNMENT OF GROUP 17

D73A-AD6      CTGAATTTTGCAATGTTAGAGGCAAAAATGGCACTTGCATTGATTCTACAACACTATGCT      SEQ ID No 89  
 D70A-BA11      CTGAATTTTGCAATGTTAGAGGCAAAAATGGCACTTGCATTGATTCTACAACACTATGCT      SEQ ID No 91  
              \*\*\*\*\*  
 D73A-AD6      TTTGAGCTCTCTCCATCTTATGCACATGCTCCTCATAAATTATCACTCTGCAACCTCAA  
 D70A-BA11      TTTGAGCTCTCTCCATCTTATGCACACGCTCCTCATAAATTATCACTCTGCAACCTCAA  
              \*\*\*\*\*  
 D73A-AD6      CATGGTGCTCCTTTGATTTTGGCGAAGCTGTAG  
 D70A-BA11      CATGGTGCTCCTTTGATTTTGGCGAAGCTGTAG  
              \*\*\*\*\*

FIGURE 151: COMPARISON OF SEQUENCE GROUPS

PERCENT IDENTITY OF GROUP 17

	<u>D73A-AD</u>	<u>70A-BA11</u>	
D73A-AD6	***	99.3	SEQ ID No 89
D70A-BA11		***	SEQ ID No 91

ALIGNMENT OF GROUP 18

D70A-AB5	CAAACTTCGCGATTTTGGGAAGCAAAATGGCTATAGCTATGATTCTACAACGCTTCTCC	SEQ ID No 95
D70A-AA8	CAAACTTCGCGATTTTGGGAAGCAAAATGGCTATAGCTATGATTCTACAACGCTTCTCC *****	SEQ ID No 97
D70A-AB5	TTTGAGCTCTCCCATCTTATACACACTCTCCATACACTGTGGTCACTTTGAAACCCAAA	
D70A-AA8	TTTGAGCTCTCTCCCATCTTATACACACTCTCCATACACTGTGGTCACTTTGAAACCCAAA *****	
D70A-AB5	TATGGTGCTCCCTAATAATGCACAGGCTGTAG	
D70A-AA8	TATGGTGCTCCCTAATAATGCACAGGCTGTAG *****	

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PERCENT IDENTITY OF GROUP 18

	<u>D70A-AB5</u>	<u>D70A-AA8</u>	
D70A-AB5	***	99.6	SEQ ID No 95
D70A-AA8		***	SEQ ID No 97

ALIGNMENT OF GROUP 19

D70A-AB8	CAAAATTTGCCATGTTAGAAGCAAGATGGCTCTGTCTATGATCCTGCAACGCTTCTCT	SEQ ID No 99
D70A-BH2	ATAAACTTTGCAATGACAGAAGCGAAGATGGCTATGGCTATGATTCTGCAACGCTTCTCC 	SEQ ID No 101
D70A-AA4	ATAAACTTTGCAATGCGAGAAGCGAAGATGGCTATGGCTATGATTCTGCAACGCTTCTCC *** **	SEQ ID No 103
D70A-AB8	TTTGAAGTGTCTCCGCTCTTATGCACATGCCCTCAGTCCATATTAACCGT-CAGCCACAA 	
D70A-BH2	TTTGAGCTATCTCCATCTTACACACATGCTCCACAGTCTGTAATAACTATGCAACCCCAA 	
D70A-AA4	TTTGAGCTATCTCCATCTTACACACATGCTCCACAGTCTGTAATAACTATGCAACCCCAA *****	
D70A-AB8	TATGGTGCTCCACTTATTTCCACAAGCTATAA 	
D70A-BH2	TATGGTGCTCCTCTTATATTGCACAAATTGTAA	
D70A-AA4	TATGGTGCTCCTCTTATATTGCACAAATTGTAA *****	

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PERCENT IDENTITY OF GROUP 19

	<u>D70A-AB8</u>	<u>D70A-AA4</u>	<u>D70A-BH2</u>	
D70A-AB8	***	77.8	77.8	SEQ ID No 99
D70A-AA4		***	99.3	SEQ ID No 101
D70A-BH2			***	SEQ ID No 103

ALIGNMENT OF GROUP 20

## FIGURE 151: COMPARISON OF SEQUENCE GROUPS

D70A-BA1	CAAACCTTTGCAATGATGGAAGCAAAAATGGCAGTAGCTATGATACTACAAAATTTTCC	SEQ ID No 105
D70A-BA9	CAAACCTTTGCAATGATGGAAGCAAAAATGGCAGTAGCTATGATACTACATAAATTTTCC *****	SEQ ID No 107
D70A-BA1	TTTGAACATATCCCTTCTTATACACATGCTCCATTGCAATTGTGACTATTTCATCCTCAG	
D70A-BA9	TTTGAACATATCCCTTCTTATACACATGCTCCATTGCAATTGTGACTATTTCATCCTCAG *****	
D70A-BA1	TATGGTGCTCCTCTGCTTATGCCGACACTTTAA	
D70A-BA9	TATGGTGCTCCTCTGCTTATGCCGACACTTTAA *****	

## PERCENT IDENTITY OF GROUP 20

	<u>D70A-BA1</u>	<u>D70A-BA9</u>	
D70A-BA1	***	99.4	SEQ ID No 105
D70A-BA9		***	SEQ ID No 107

## ALIGNMENT OF GROUP 22

D144-AH1	TATAGCTTGGGGCTCAAGGAGATTCAAGCTAGCTTAGCTAATCTTCTACATGGATTTAAC	SEQ ID No 113
D34-65	CATAGCTTGGGGCTCAAGGTGATTCAAGCTAGCTTAGCTAATCTTCTACATGGATTTAAC	SEQ ID No 115
D181-AC5	TATAGCTTGGGGCTCAAGGCGATTCAAGCTAGCTTAGCTAATCTTCTACATGGATTTAAC *****	SEQ ID No 111
D144-AH1	TGGTCATTGCCTGATAATATGACTCCTGAGGACCTCAACATGGATGAGATTTTGGGCTC	
D34-65	TGGTCATTGCCTGATAATATGACTCCTGAGGACCTCAACATGGATGAGATTTTGGGCTC	
D181-AC5	TGGTCATTGCCTGATAATATGACTCCTGAGGACCTCAACATGGATGAGATTTTGGGCTC *****	
D144-AH1	TCTACACCTAAAAAATTTCCACTTGCTACTGTGATTGAGCCAAGACTTTCACCAAACTT	
D34-65	TCTACACCTAAAAAATTTCCACTTGCTACTGTGATTGAGCCAAGACTTTCACCAAACTT	
D181-AC5	TCTACACCTAAAAAATTTCCACTTGCTACTGTGATTGAGCCAAGACTTTCACCAAACTT *****	
D144-AH1	TACTCTGTTTGA	
D34-65	TACTCTGTTTGA	
D181-AC5	TACTCTGTTTGA *****	

## PERCENT IDENTITY OF GROUP 22

	<u>D34-65</u>	<u>D181-AC5</u>	<u>D144-AH1</u>	
D34-65	***	98.4	99.0	SEQ ID No 115
D181-AC5		***	99.0	SEQ ID No 111
D144-AH1			***	SEQ ID No 113

## ALIGNMENT OF GROUP 25

D58-AA1	TTGGGCTTGGCAACGGTGCATGTGATTGATGTTGGCCCGAATGATTCAAGAATTGAA	SEQ ID No 121
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FIGURE 151: COMPARISON OF SEQUENCE GROUPS

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D185-BC1      TTGGGCTTGGCAACGGTGCATGTGAATTTGATGTTGGCCCGAACGATTCAAGAATTTGAA  SEQ ID No 133
D185-BG2      TTGGGCTTGGCAACGGTGCATGTGAATTTGATGTTGGCCCGAACGATTCAAGAATTTGAA  SEQ ID No 135
                *****
D58-AA1       TGGTCCGCTTACCCGGAAATAGGAAAGTGGATTTTACTGAGAAATTGGAATTTACTGTG
D185-BC1       TGGTCCGCTTACCCGGAAATAGGAAAGTGGATTTTACTGAGAAATTGGAATTTACTGTG
D185-BG2       TGGTCCGCTTACCCGGAAATAGGAAAGTGGATT-ACTGAGAAATTGGAATTTACTGTG
                *****
D58-AA1       GTGATGAAAAATCCTTTAAGAGCTAAGGTCAAGCCAAGAATGCAAGTGGTGTA
D185-BC1       GTGATGAAAAACCTTTAAGAGCTAAGGTCAAGCCAAGAATGCAAGTGGTGTA
D185-BG2       GTGA-----
                ****

```

PERCENT IDENTITY OF GROUP 25

	D58-AA1	D185-BG2	D185-BC1	
D58-AA1	***	95.9	98.9	SEQ ID No 121
D185-BG2		***	95.1	SEQ ID No 135
D185-BC1			***	SEQ ID No 133

ALIGNMENT OF GROUP 28

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D177-BF7      ATCACATTGCTAAGTTTGTGAATGAGCTAGCATTGGCAAGATTAATGTTCCATTTTGAT  SEQ ID No 127
D185-BD2      ATCACATTGCTAAGTTTGTGAATGAGCTAGCATTGGCAAGATTAATGTTCCATTTTGAT  SEQ ID No 139
D185-BE1      ATCACATTGCTAAGTTTGTGAATGAGCTAGCATTGGCAAGATTAATGTTCCATTTTGAT  SEQ ID No 137
                *****
D177-BF7      TTCTCGCTACCAAAGGAGTTAAGCATGAGGATTTGGACGTGGAGGAAGCTGCTGGAATT
D185-BD2      TTCTCGCTACCAAAGGAGTTAAGCATGCGGATTTGGACGTGGAGGAAGCTGCTGGAATT
D185-BE1      TTCTCGCTACCAAAGGAGTTAAGCATGAGGATTTGGACGTGGAGGAAGCTGCTGGAATT
                *****
D177-BF7      ACTGTTAGAAGGAAGTTCCCCCTTTTAGCCGTCGCCACTCCATGCTCGTGA
D185-BD2      ACTGTTAGAAGGAAGTTCCCCCTTTTAGCCGTCGCCACTCCATGCTCGTGA
D185-BE1      ACTGTTAGGAGGAAGTTCCCCCTTTTAGCCGTCGCCACTCCATGCTCGTGA
                *****

```

PERCENT IDENTITY OF GROUP 28

	D177-BF7	D185-BD2	D185-BE1	
D177-BF7	***	99.4	99.4	SEQ ID No 127
D185-BD2		***	98.8	SEQ ID No 139
D185-BE1			***	SEQ ID No 137

ALIGNMENT OF GROUP 30

FIGURE 151: COMPARISON OF SEQUENCE GROUPS

D70A-AA12	ATGTCATTGGTTTAGCTAATCTTTACTTACCATTGGCTCAATTACTCTATCACTTTGAC	SEQ ID No 131
D176-BF2	ATATCATTGGTTTGGCTAATGTTTATTTGCCACTAGCTCAATTGTTATATCATTTTGAT	SEQ ID No 85
	** ***** **	
D70A-AA12	TGGAAACTCCCAACCGGAATCAAGCCAAGAGACTTGGACTTGACCGAATTATCGGGAATA	
D176-BF2	TGGAAACTCCCTACTGGAATCAATCAAGTGACTTGGACATGACTGAGTCGTCAGGAGTA	
	***** ** ***** **	
D70A-AA12	ACTATTGCTAGAAAGGGTGACCTTTACTTAAATGCTACTCCTTATCAACCTTCTCGAGAGTAA	
D176-BF2	ACTTGTGCTAGAAAGAGTGATTATACTTGACTGCTACTCCATATCAACTTCTCAAGAGTGA	
	** ***** **	

PERCENT IDENTITY OF GROUP 30

	<u>D176-BF2</u>	<u>D70A-AA12</u>	
D176-BF2	***	77.0	SEQ ID No 85
D70A-AA12		***	SEQ ID No 131

FIGURE 152A: Alignment of Full Length Clones

GROUP 1	ExxRxxP	LLVPHENVED	CVVSGYHIPK	GTRLFANVMK	LQRDPKILMSD	PDTFDPERFI	ATDIDERGQY	YKYIPFGSGR	RSC SEQ.	ID. No. 299
D208-AD9 98.8	EVLRLYPPGP	LLVPHENVED	CVVSGYHIPK	GTRLFANVMK	LQRDPKILMSD	PDTFDPERFI	ATDIDERGQY	YKYIPFGSGR	RSC SEQ.	ID. No. 300
D120-AH4 97.6	EVLRLYPPGP	LLVPHENVED	CVVSGYHIPK	GTRLFANVMK	LQRDPKILMSD	PDTFDPERFI	ATDIDERGQY	YKYIPFGSGR	RSC SEQ.	ID. No. 301
D121-AA8 91.6	EVLRLYPPGP	LLVPHENVED	CVVSGYHIPK	GTRLFANVMK	LQRDPKILMSN	PDKFDPERFF	ADDIDYRGQH	YEFIPFGSGR	RSC SEQ.	ID. No. 302
D122-AF10 91.6	KVLRLYPPGP	LLVPHENVKD	CVVSGYHIPK	GTRLFANVMK	LQRDPKILSN	PDKFDPERFI	AGDIDFRGHH	YEFIPSGSGR	RSC SEQ.	ID. No. 303
D103-AH3 98.8	KVLRLYPPGP	LLVPHENVKD	CVVSGYHIPK	GTRLFANVMK	LQRDPKILSN	PDKFDPERFI	AGDIDFRGHH	YEFIPFGSGR	RSC SEQ.	ID. No. 304
D208-AC8 98.8	KVLRLYPPGP	LLVPHENVKD	CVVSGYHIPK	GTRLFANVMK	LQRDPKILSN	PDKFDPERFI	AGDIDFRGHH	YEFIPFGSGR	RSC SEQ.	ID. No. 305
D235-AB1	KVLRLYPPGP	LLVPHENVKD	CVVSGYHIPK	GTRLFANVMK	LQRDPKILSN	PDKFDPERFI	AGDIDFRGHH	YEFIPFGSGR	RSC SEQ.	ID. No. 306
GROUP 2	ExxRxxP	FLLPHEAVQD	CKVTGYHIPK	GTRLYINAWK	VHRDPEIWS	PEKEMPNRFL	TSKANIDARG	QNFEFIPFGS	GRRSC SEQ.	ID. No. 307
D244-AD4 100.0	ETLRLYPPVP	FLLPHEAVQD	CKVTGYHIPK	GTRLYINAWK	VHRDPEIWS	PEKEMPNRFL	TSKANIDARG	QNFEFIPFGS	GRRSC SEQ.	ID. No. 308
D244-AB6 98.8	ETLRLYPPVP	FLLPHEAVQD	CKVTGYHIPK	GTRLYINAWK	VHRDPEIWS	PEKEMPNRFL	TSKANIDARG	QNFEFIPFGS	GRRSC SEQ.	ID. No. 309
D285-AA8 100.0	ETLRLFPPVP	FLLPHEAVQD	CKVTGYHIPK	GTRLYINAWK	VHRDPEIWS	PEKEMPNRFL	TSKANIDARG	QNFEFIPFGS	GRRSC SEQ.	ID. No. 310
D285-AB9 97.6	ETLRLFPPVP	FLLPHEAVQD	CKVTGYHIPK	GTRLYINAWK	VHRDPEIWS	PEKEMPNRFL	TSKANIDARG	QNFEFIPFGS	GRRSC SEQ.	ID. No. 311
D268-AE2	ETLRLFPPVP	FLLPHEAVQD	CKVTGYHIPK	GTRLYINAWK	VHRDSEIWS	PEKEMPNRFL	TSKANIDARG	QNFEFIPFGS	GRRSC SEQ.	ID. No. 312
GROUP 3	ExxRxxP	LLVPHESSEE	TTVGGYRVPG	GTMLLVNLWA	IHNDPKLWDE	PRKFKPERFE	GLEGVRDGYK	MMPFGSGRRS	C SEQ.	ID. No. 311
D100A-AC3 97.6	ETFRMYPAGP	LLVPHESSEE	TTVGGYRVPG	GTMLLVNLWA	IHNDPKLWDE	PRKFKPERFE	GLEGVRDGYK	MMPFGSGRRS	C SEQ.	ID. No. 312
D100A-BE2	ETFRMYPAGP	LLVPHESSEE	TTVGGYRVPG	GTMLLVNLWA	IHNDPKLWDE	PRKFKPEREQ	GLDGVRDGYK	MMPFGSGRRS	C SEQ.	ID. No. 312

FIGURE 152B: Alignment of Full Length Clones

GROUP 4											
D205-BG9		ExxRxxP		FxPERF				Gx RxC			
100.0		ETMRLYTPIP		LLLPHYSTKD CIVEGYDVPK HTMLFVNWA IHRDPKVWEE PDKFKPERFE				ATEGETERFN YKLVPFGMGR RAC SEQ. ID. No. 313			
D205-BE9		ETMRLYTPIP		LLLPHYSTKD CIVEGYDVPK HTMLFVNWA IHRDPKVWEE PDKFKPERFE				ATEGETERFN YKLVPFGMGR RAC SEQ. ID. No. 314			
100.0											
D205-AH4		ETMRLYTPIP		LLLPHYSTKD CIVEGYDVPK HTMLFVNWA IHRDPKVWEE PDKFKPERFE				ATEGETERFN YKLVPFGMGR RAC SEQ. ID. No. 315			
GROUP 5											
D259-AB9		ExxRxxP		FxPERF				Gx RxC			
100.0		ETMRLHPVAP		MLVPRECREK IKVAGYDVQK GTRVLVSVWT IGRDPTLWDE PEVFKPERFH				EKSIDVKGHD YELLPPFAGR RMC SEQ. ID. No. 316			
D257-AE4		ETMRLHPVAP		MLVPRECREK IKVAGYDVQK GTRVLVSVWT IGRDPTLWDE PEVFKPERFH				EKSIDVKGHD YELLPPFAGR RMC SEQ. ID. No. 317			
98.8											
D147-AD3		ETMRLHPVAP		MLVPRECREK IKVAGYDVQK GTRVLVSVWT IGRDPTLWDE PEVFKPERFH				ERSIDVKGHD YELLPPFAGR RMC SEQ. ID. No. 318			
GROUP 6											
D249-AEB		ExxRxxP		FxPERF				Gx RxC			
98.8		EALRLHPPTP		IMLPHRASAS VKIGGYDIPK GSIVHVNWA VARDPAVWKN PLEFRPERFL				EEDVDMKGHD YRLPPFAGR RVC SEQ. ID. No. 319			
D248-AA6		EALRLHPPTP		IMLPHKASAS VKIGGYDIPK GSIVHVNWA VARDPAVWKN PLEFRPERFL				EEDVDMKGHD YRLPPFAGR RVC SEQ. ID. No. 320			
GROUP 7											
D233-AG7		ExxRxxP		FxPERF				Gx RxC			
98.8		ETLRLHPLGT		MLAPHCATED CNVAGYDIQK GTTFLNVNVT IGRDPKYWDR AQEFLPERFL				ENDIDMDGHN FAELPFGSGR RRC SEQ. ID. No. 321			
D224-BD11		ETLRLHPLGT		MLAPHCATED CNVAGYDIQK GTTFLNVNVT IGRDPKYWDR AQEFLPERFL				ENDIDMDGHN FAELPFGSGR RRC SEQ. ID. No. 322			
100.0											
D224-AF10		ETLRLHPLGT		MLAPHCATED CNVAGYDIQK GTTFLNVNVT IGRDPKYWDR AQEFLPERFL				ENDIDMDGHN FAELPFGSGR RRC SEQ. ID. No. 323			
GROUP 8											
D105-AD6		ExxRxxP		FxPERF				Gx RxC			
100.0		EVLRLYPAGY		VINRMVNKET KLGNLCIPAG VQLVLPMTLL QHDTEIWGDD AMEENPERFS				DGISKATKKG LVFFPFSWGP RIC SEQ. ID. No. 324			
D215-AB5		EVLRLYPAGY		VINRMVNKET KLGNLCIPAG VQLVLPMTLL QHDTEIWGDD AMEENPERFS				DGISKATKKG LVFFPFSWGP RIC SEQ. ID. No. 325			
95.2											
D135-AE1		EVLRLYPAGY		AINRMVTKET KLGNLCIPAG VQLLLPTILL QHDTEIWGDD AMEENPERFS				DGISKATKKG LVFFPFSWGP RIC SEQ. ID. No. 326			

FIGURE 152C: Alignment of Full Length Clones

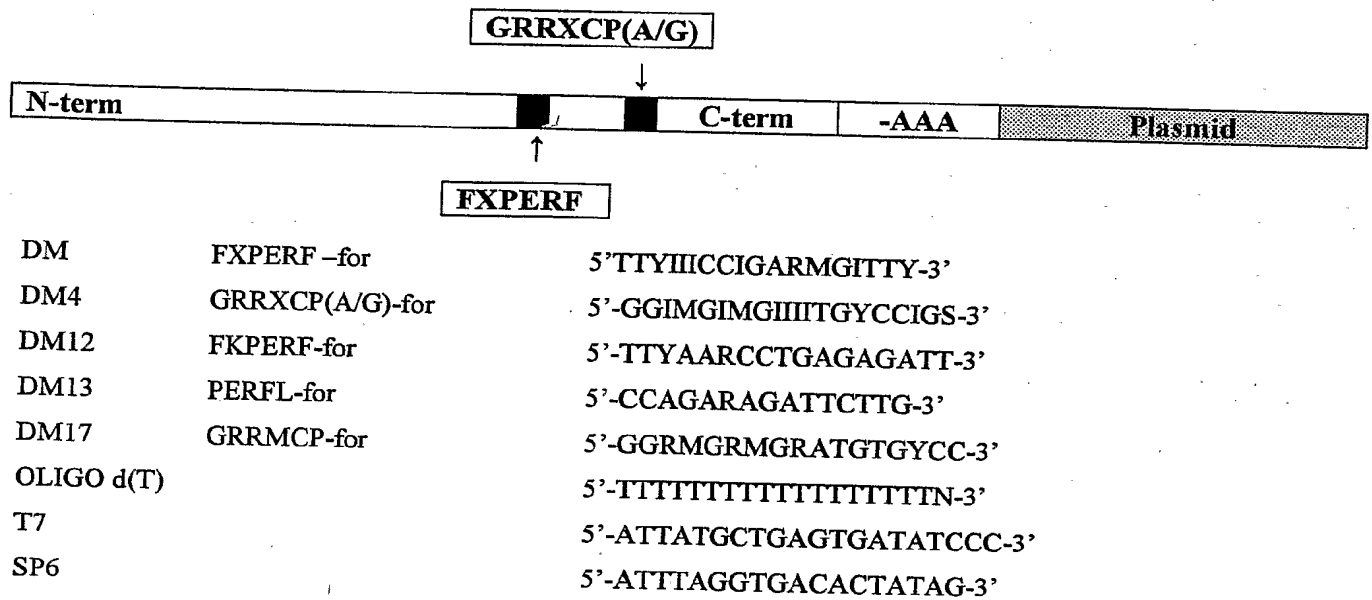
GROUP 9											
D87A-AF3		ExxRxxP		FxPERF				Gx RxC			
100.0	ESLRLYPPIA	TRTRTNEET	KLGLDLPGK	ALLFIPTILL	HLDKEIWGED	ADEFNPERFS	EGVAKATGK	MTYFPFGAGP	RKC SEQ.	ID. No. 327	
D210-BD4		ESLRLYPPIA		TRTRTNEET	KLGLDLPGK	ALLFIPTILL	HLDREIWGED	ADEFNPERFS	EGVAKATGK	MTYFPFGAGP	RKC SEQ. ID. No. 328
GROUP 10											
D89-AB1		ExxRxxP		FxPERF				Gx RxC			
100.0	ETLRMHPPIP	LLVPRECMED	TKIDGYNIPF	KTRVIVNAWA	IGRDPESWDD	PESEMPERFE	NSSIDFLGNH	HQFIPFGAGR	RIC SEQ.	ID. No. 329	
D89-AD2	ETLRMHPPIP	LLVPRECMED	TKIDGYNIPF	KTRVIVNAWA	IGRDPESWDD	PESEMPERFE	NSSIDFLGNH	HQFIPFGAGR	RIC SEQ.	ID. No. 330	
100.0	ETLRMHPPIP	LLVPRECMED	TKIDGYNIPF	KTRVIVNAWA	IGRDPESWDD	PESEMPERFE	NSSIDFLGNH	HQFIPFGAGR	RIC SEQ.	ID. No. 331	
D163-AG12	98.8	ETLRMHPPIP	LLVPRECMED	TKIDGYNIPF	KTRVIVNAWA	IGRDPQSWDD	PESFTPERFE	NNSIDFLGNH	HQFIPFGAGR	RIC SEQ. ID. No. 332	
D163-AG11	100.0	ETLRMHPPIP	LLVPRECMED	TKIDGYNIPF	KTRVIVNAWA	IGRDPQSWDD	PESFTPERFE	NNSIDFLGNH	HQFIPFGAGR	RIC SEQ. ID. No. 333	
D163-AF12		ETLRMHPPIP		LLVPRECMED	TKIDGYNIPF	KTRVIVNAWA	IGRDPQSWDD	PESFTPERFE	NNSIDFLGNH	HQFIPFGAGR	RIC SEQ. ID. No. 333
GROUP 11											
D267-AF10		ExxRxxP		FxPERF				Gx RxC			
100.0	ETLRMHPPVP	LLGPRECRDQ	TEIDGYTVPI	KARVMVNAWA	IGRDPESWED	PESEFKPERFE	NTSVDLTGNH	YQFIPFGSGR	RMC SEQ.	ID. No. 334	
D96-AC2	100.0	ETLRMHPPVP	LLGPRECRDQ	TEIDGYTVPI	KARVMVNAWA	IGRDPESWED	PESEFKPERFE	NTSVDLTGNH	YQFIPFGSGR	RMC SEQ. ID. No. 335	
D96-AB6	96.4	ETLRMHPPVP	LLGPRECRDQ	TEIDGYTVPI	KARVMVNAWA	IGRDPESWED	PESEFKPERFE	NTSVDLTGNH	YQFIPFGSGR	RMC SEQ. ID. No. 336	
D207-AA5	100.0	ETLRMHPPVP	LLGPRECREQ	TEIDGYTVPL	KARVMVNAWA	IGRDPESWED	PESEFKPERFE	NISVDLTGNH	YQFIPFGSGR	RMC SEQ. ID. No. 337	
D207-AB4	100.0	ETLRMHPPVP	LLGPRECREQ	TEIDGYTVPL	KARVMVNAWA	IGRDPESWED	PESEFKPERFE	NISVDLTGNH	YQFIPFGSGR	RMC SEQ. ID. No. 338	
D207-AC4		ETLRMHPPVP		LLGPRECREQ	TEIDGYTVPL	KARVMVNAWA	IGRDPESWED	PESEFKPERFE	NISVDLTGNH	YQFIPFGSGR	RMC SEQ. ID. No. 339
GROUP 12											
D98-AG1		ExxRxxP		FxPERF				Gx RxC			
100.0	ETLRHLPTTP	LLVPRECREE	TEIEGFTIPL	KSKVLNVWA	IGRDPENWKN	PECFIPERFE	NSSIEFTGNH	FOLLIPFGAGR	RIC SEQ.	ID. No. 340	
D98-AA1	ETLRHLPTTP	LLVPRECREE	TEIEGFTIPL	KSKVLNVWA	IGRDPENWKN	PECFIPERFE	NSSIEFTGNH	FOLLIPFGAGR	RIC SEQ.	ID. No. 341	

FIGURE 152D: Alignment of Full Length Clones

GROUP 13		ExxRxxP		FxPERF		Gx RxC	
D209-AA10	100.0	ETLRLHPPVP	LLLPRECREE	TNINGYTIPTV	KTKVMNVNVA	LGRDPKYWND	AETFMPEFFE QCSKDFVGNN FEYLPFGGGR RIC SEQ. ID. No. 342
D209-AA12	100.0	ETLRLHPPVP	LLLPRECREE	TNINGYTIPTV	KTKVMNVNVA	LGRDPKYWND	AETFMPEFFE QCSKDFVGNN FEYLPFGGGR RIC SEQ. ID. No. 343
D209-AH10	100.0	ETLRLHPPVP	LLLPRECREE	TNINGYTIPTV	KTKVMNVNVA	LGRDPKYWND	AETFMPEFFE QCSKDFVGNN FEYLPFGGGR RIC SEQ. ID. No. 344
D209-AH12	97.6	ETLRLHPPVP	LLLPRECREE	TNINGYTIPTV	KTKVMNVNVA	LGRDPKYWND	AETFMPEFFE QCSKDFVGNN FEYLPFGGGR RIC SEQ. ID. No. 345
D90a-BB3		ETLRLHPPVP	LLLPRECREE	TNINGYTIPTV	KTKVMNVNVA	LGRDPKYWDD	AETFKPERFE QCSKDFVGNN FEYLPFGGGR RIC SEQ. ID. No. 346
GROUP 14		ExxRxxP		FxPERF		Gx RxC	
D129-AD10	100.0	ETLRLHPPLP	LLLHETAEE	TVSGYHIPAK	SHVIINSEAI	GRDKNSWEDP	ETYKPSRELK EGVDFKGGN FEFIFGSGR RSC SEQ. ID. No. 347
D104A-AE8		ETLRLHPPIP	LLLHETAEE	TVSGYHIPAK	SHVIINSEAI	GRDKNSWEDP	ETYKPSRELK EGVDFKGGN FEFIFGSGR RSC SEQ. ID. No. 348
GROUP 15		ExxRxxP		FxPERF		Gx RxC	
D228-AH8	100.0	EIFRLYPEAP	LIVPRESMEK	TILEGYEIRP	RTIVHVNWA	IARDEIWIEN	PDEFIERFL NSSIDYKGQD FELLPGAGR RGC SEQ. ID. No. 349
D228-AD7	100.0	EIFRLYPEAP	LIVPRESMEK	TILEGYEIRP	RTIVHVNWA	IARDEIWIEN	PDEFIERFL NSSIDYKGQD FELLPGAGR RGC SEQ. ID. No. 350
D250-AC11	100.0	EIFRLYPEAP	LIVPRESMEK	TILEGYEIRP	RTIVHVNWA	IARDEIWIEN	PDEFIERFL NSSIDYKGQD FELLPGAGR RGC SEQ. ID. No. 351
D247-AH1		EIFRLYPEAP	LIVPRESMEK	TILEGYEIRP	RTIVHVNWA	IARDEIWIEN	PDEFIERFL NSSIDYKGQD FELLPGAGR RGC SEQ. ID. No. 352
GROUP 16		ExxRxxP		FxPERF		GxRxC	
D128-AB7	98.8	EALRLRMAIP	LIVPHMNLHD	AKLGGDIPA	ESKILVNAAW	LANNPAHWK	PEEFPERFF EEEKHVEANG NDFRILPFGV GRRSC SEQ. ID. No. 353
D243-AA2	97.7	EALRLRMAIP	LIVPHMNLHD	AKLGGDIPA	ESKILVNAAW	LANNPAHWK	PEEFPERFF EEEKHVEANG NDFRILPFGV GRRSC SEQ. ID. No. 354
D125-AF11		ETLRLRMAIP	LIVPHMNLHD	AKLGGDIPA	ESKILVNAAW	LANNPAHWK	PEEFPERFF EEEKHVEANG NDFRILPFGV GRRSC SEQ. ID. No. 355

FIGURE 152E: Alignment of Full Length Clones

GROUP 17	ExxRxxP	ILGNVSLPEG	VLISLPVILL	HHDEEIWGKD	-KKFNPERFR	DGVSSATKGQ	VTFPPFTWGP	RIC SEQ.	ID. No.
D284-AH5	ESLRLYSPVW	SLIRRNEDA	ILGNVSLPEG	VLISLPVILL	HHDEEIWGKD	-KKFNPERFR	DGVSSATKGQ	VTFPPFTWGP	RIC SEQ. 356
86.7									
D110-AF12	ESLRLYPPVW	TLTRRPKEDT	VLGDVSLPAG	VLISLPVILL	HHDEEIWGKD	AKKFKPERFR	DGVSSATKGQ	VTFPPFTWGP	RIC SEQ. 357

**Figure 153: Cloning of Cytochrome P450 cDNA Fragments by PCR**

I = DeoxyInosine; Y = C, T; M = A, C; R = A, G; S = C, G; N = A, T, C, G